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Temporary Employment in Markets with Frictions†

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Temporary employment has spiked in OECD countries over the last 40 years and is now a common feature of their labor market landscape. A large body of empirical literature examines the spread of temporary employment, but no systematic review and interpretation of its findings in light of economic theory exists. This survey aims at filling this gap by interpreting the key empirical results based on the predictions of the macro models in markets with frictions developed to address specific features of temporary employment. Revisions of workhorse models used so far to analyze temporary employment are also suggested. (*JEL* J22, J31, J41, J81, J83, K31)

1. *Introduction*

Temporary employment—defined by salary and wage earners with an employment contract with a predetermined termination date—has increased since the mid-1980s and is now a common feature of most OECD labor markets. It accounts for more than 10 percent of employees in the OECD area. In some countries, more than one out of every four contracts has a fixed duration.

A key factor determining the nature of temporary employment is the strictness of employment protection for workers with open-ended contracts. In countries with low dismissal costs, firms use temporary (fixed-term) employment to replace workers temporarily on leave. In countries with high costs of dismissals of permanent workers, that is, with open-ended contracts, temporary employment is also (and to a larger extent) a tool offering degrees of freedom to firms in adjusting employment levels. In these countries, temporary employment boomed as a result of reforms that, rather than changing the strictness of employment protection in open-ended contracts, expanded the scope of fixed-term contracts among new hires.

The economics of temporary contracts in markets with frictions is strictly connected to the literature on employment protection legislation (EPL), both empirically and theoretically. The empirical side of the literature, especially in continental Europe, investigates in detail the differences in wages, career histories, and employment spells between workers hired with open-ended contracts and workers hired on a fixed-term basis. The

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theoretical literature, and mostly the aggregate matching models analyzed in this paper, typically take the existence of EPL as given and exogenous. Against this background, the literature investigates the implications in terms of wages, employment, careers, and working conditions of dual labor markets, where open-ended contracts with stringent employment protection coexist with flexible fixed-term contracts. The exogeneity of employment protection for open-ended contracts is legitimatized by political economic models of labor market institutions and by the actual design of reforms of employment protection carried out in OECD countries.

A key purpose of this survey is to contribute to a better integration of theoretical and empirical perspectives on temporary employment. In particular, we compare the predictions of the models used to date to analyze temporary employment with the key findings of the rich empirical literature on fixed-term contracts across OECD countries. We also aim at promoting a cross-fertilization of studies carried out in Europe and in the United States on temporary employment because the literature often does not talk from one side of the Atlantic to the other.

The paper is outlined as follows. Section 2 defines temporary employment and highlights a few macro facts about its size and evolution. Section 3 presents a basic framework for interpreting temporary employment in markets with frictions. The following sections interpret the main findings of the empirical literature in light of this analytical framework. In particular, section 4 investigates the cross-country heterogeneity in the levels of temporary employment by considering its two facets: replacement of workers temporarily on leave and a tool to provide flexibility in human resource management. Section 5 looks at the implications of the coexistence of temporary and permanent employment in terms of wage differentials, as well as at the cyclical properties of temporary contracts. Section 6 focuses on careers, notably the extent to which temporary jobs are a port of entry in the labor market or a sort of absorbing employment state. Section 7 dwells on the future of temporary employment by evaluating the political feasibility of reforms changing employment protection for all workers vis-à-vis dual-track reforms preserving employment protection for open-ended contracts, the likely evolution of contractual dualism, and the effects of policies tackling this dualism. Section 8 summarizes and concludes.

2. *Definitions and Macro Evidence*

Before we proceed any further, defining temporary employment more precisely is important.

A large variety of temporary employment arrangements exist across OECD countries. They range from fixed-term to temporary work agency contracts, from vouchers to self-employment schemes with a single client, and from seasonal jobs to internships and apprenticeship contracts. Two common features of these arrangements follow:

- The presence, de facto if not de jure, of a dependent employment relationship where earnings come almost entirely from a single employer;
- The fact that contracts have an expiration date from the start, which generally allows employers to unilaterally discontinue the work relationship at expiration without incurring any employment termination costs; in a few cases employers not renewing a temporary contract at expiration have to pay severance costs that are, however, significantly lower than in the case of open-ended contracts.[1]

[1] In case of nonrenewal of a temporary contract at expiration, employers do not have to pay any severance to the worker in all OECD countries except in Colombia, Chile, South Korea, France, Mexico, Spain, and Portugal where, however, termination costs are a small fraction of those incurred in case of open-ended contracts.

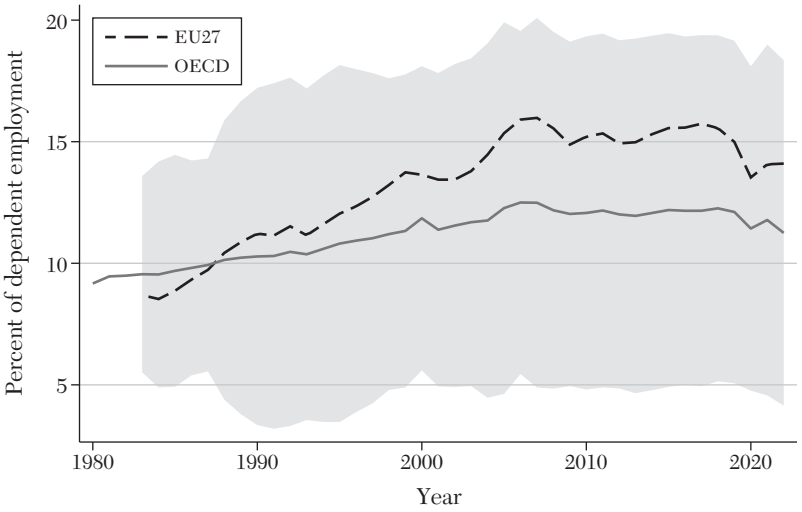

Figure 1. Evolution of Temporary Employment

Notes: The figure displays temporary employment as a percentage of dependent employment (salary and wage earners). The gray area denotes −/+ one cross-country standard deviation around the OECD average. According to the database definition, temporary employment includes wage and salary workers whose jobs have a predetermined termination date. National definitions broadly conform to this generic definition but may vary depending on national circumstances. EU27 refers to the group of 27 EU countries.

Source: OECD (2024).

In line with internationally agreed-upon definitions (OECD statistics), we focus in this survey only on dependent employment positions (salary and wage earners) with a predetermined termination date.[2] However, keep in mind that in several countries, solo self-employment arrangements with a single client (like most of the so-called project contracts in Italy or vouchers in Nordic countries) have many characteristics in common with temporary employment. The statistics displayed in this survey do not include so-called alternative employment arrangements, and the theory describes wage-earning positions rather than employment conditions yielding incomes of the residual claimant type.

With the above caveats in mind, figure 1 documents the size and the evolution over time of temporary employment in OECD countries in the last 40 years.[3] Data are drawn from the OECD database on temporary employment.

The share of temporary employment in total dependent employment has been rising on average by 30 percent in OECD countries since the early 1980s. The growth has been stronger in the European Union, where temporary employment almost doubled its incidence over the last 40 years. These trends should not conceal substantial cross-country heterogeneity. In 2021, the incidence of temporary employment ranged from a low 1.7 percent in Estonia to a high

[2] Our notion of temporary employment includes contingent workers who are wage earners, in line with estimate 1 of contingent workers provided by the BLS (2018).

[3] For replicating data and codes for figure and simulations included in the paper, see Boeri and Garibaldi (2024).

TABLE 1
Relative Volatility of temporary Employment—Selected OECD Countries, 1998–2020

Country	Standard deviation ratios		
	$\sigma_{TEMP}/\sigma_{GDP}$	$\sigma_{PERM}/\sigma_{GDP}$	$\sigma_{TEMP}/\sigma_{PERM}$
Austria	0.66	0.18	3.76
Belgium	0.78	0.16	4.77
Canada	0.72	0.24	3.03
France	0.32	0.08	4.05
Germany	0.71	0.24	2.93
Italy	0.72	0.12	6.17
Japan	0.56	0.19	2.88
Netherlands	0.76	0.31	2.43
Norway	0.48	0.13	3.81
Portugal	0.73	0.22	3.35
Spain	0.66	0.27	2.45
Sweden	0.79	0.21	3.81
Switzerland	0.48	0.13	3.73
United Kingdom	0.34	0.09	3.97
EU27	0.48	0.13	3.76
EU Area	0.48	0.11	4.55

Notes: The table reports for each country the ratio between the standard deviations (using quarterly data in the period 1998–2020) of the growth rates of temporary employment and GDP (column 1), of the growth rates of permanent employment and GDP (column 2), and of the growth rates of temporary employment and permanent employment (column 3). EU 27 refers to the countries of the European Union while EU Area refers to the countries that adopt the euro.

Sources: Eurostat (2024b); Statistics Canada (2021); Statistics Bureau of Japan (2021).

28.3 percent in South Korea, and the widening bands around the cross-country average document a cross-country standard deviation in the incidence of temporary employment increasing over time.

OECD labor markets are therefore characterized by a substantial degree of contractual dualism with the coexistence of a majoritarian component of open-ended contracts, as well as a substantial share of temporary employment. This coexistence generates dual wage structures, with workers with the same characteristics being paid differently based on the nature of their contract. The two segments also behave differently over the business cycle. The first two columns of table 1 display the standard deviations of the growth rates of temporary and permanent employment relative to the standard deviation of GDP for all countries for which data are available at quarterly frequencies. The third column displays the time-series standard deviation of growth rates of temporary employment relative to the same measure for permanent employment.

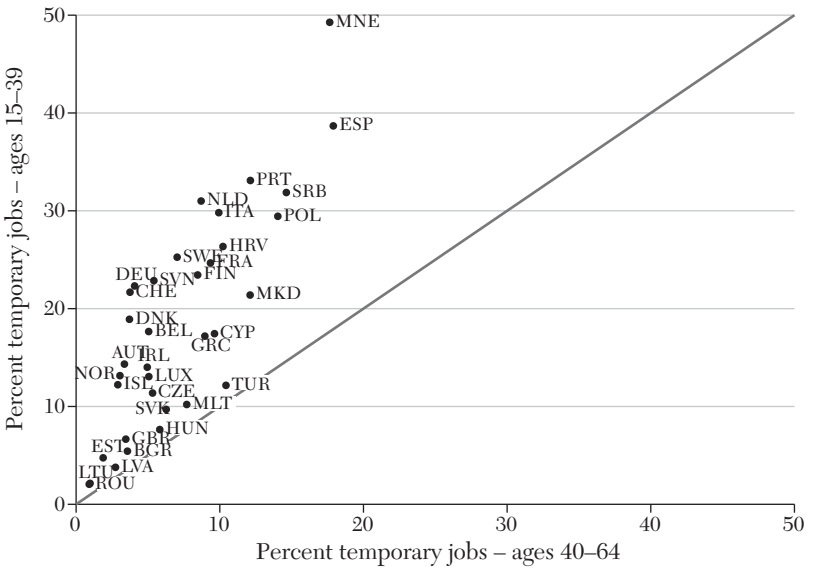

Figure 2. Age Profile of Temporary Employment

Note: Share of temporary employment in total dependent employment (salary and wage earners) by age group in 2019. Country codes are as follows: AUT, Austria; BEL, Belgium; BGR, Bulgaria; CHE, Switzerland; CYP, Cyprus; CZE, Czech Republic; DEU, Germany; DNK, Denmark; ESP, Spain; EST, Estonia; FIN, Finland; FRA, France; GBR, Great Britain; GRC, Greece; HRV, Croatia; HUN, Hungary; IRL, Ireland; ISL, Iceland; ITA, Italy; LTU, Lithuania; LUX, Luxemburg; LVA, Latvia; MKD, Republic of North Macedonia; MLT, Malta; MNE, Montenegro; NLD, the Netherlands; NOR, Norway; POL, Poland; PRT, Portugal; ROU, Romania; SRB, Serbia; SVK, Slovakia; SVN, Slovenia; SWE, Sweden; TUR, Turkey.
Source: Eurostat (2024a, b).

The message is clear: temporary employment is much more volatile than permanent employment. Evidence also shows that during recoveries, countries with a higher share of temporary employment have a larger fraction of on-the-job seekers than countries with a limited incidence of temporary employment.

Another macro fact is that temporary employment is higher among young workers (see figure 2) than across the other age groups. This finding may induce one to think temporary employment is a port of entry in the labor market, a sort of step between unemployment and employment. However, temporary employment is non-negligible also among other age groups.

Figure 3 provides a visual characterization of policies that enhanced the scope of temporary employment. It documents reforms of employment protection in OECD countries between the mid-1980s and 2019 by displaying the evolution of two indexes produced by the OECD measuring the strictness of employment protection for workers with permanent contracts (continuous line) and for workers with fixed-term contracts (dotted line), respectively. Both indexes are increasing in the strictness of regulations and are displayed by taking the cross-country (unweighted) average over time. As figure 3 shows, the index for permanent contracts hardly changed in OECD countries over the period covered by the data. By contrast, the regulation of temporary contracts was substantially eased in most European countries. In particular, the scope of fixed-term contracts was significantly expanded.

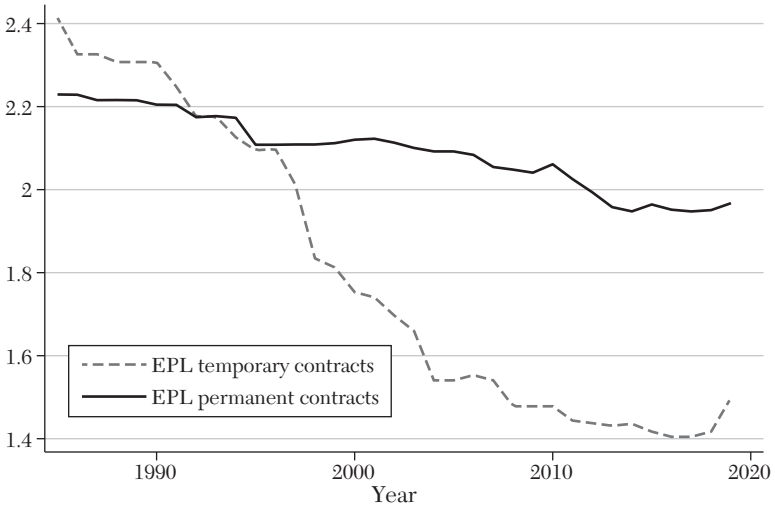

Figure 3. Evolution of the Average Index of Strictness of Employment Protection for Open-ended and Temporary Contracts in Selected OECD Countries, 1985–2019

Notes: The figure displays the evolution over time of the average EPL index for temporary contracts (dotted line) and permanent contracts (solid line) between 1985 and 2019. The index is increasing in the strictness of EPL. Average EPL is computed for a balanced set of countries for which the EPL index for both permanent and temporary contracts is available over the whole period (Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom, the United States). See OECD Employment Outlook (2020) for definitions of the index components.

Source: OECD (2021a, b).

These statistics raise a number of issues:

1. **Size and Evolution of Temporary Employment:** What explains the growth of temporary employment and, at the same time, the increasing cross-country variation in the levels of temporary employment?

2. **Contractual Dualism, Wages, and the Business Cycle**: What are the implications of contractual dualism? Why do temporary workers earn less than their counterparts with open-ended contracts? Why is temporary employment so much more volatile than permanent employment over the business cycle?

3. **Careers of Temporary Workers**: Is temporary employment a port of entry in the primary labor market of permanent contracts or a long-run outcome for entrants? Do temporary workers receive less training than other workers?

4. **The Future of Contractual Dualism**: What should we expect to happen in the countries that experienced such a strong rise of temporary employment? Will this growth level off or will fixed-term contracts gradually replace

TABLE 2
THEORIES OF TEMPORARY EMPLOYMENT: TAXONOMY AND MAIN PREDICTIONS

Model	EPL	Research question	Role of temp	Environment	Main predictions	References
A1	Absent	Do firms use fixed-term jobs to replace absentee employees?	Replace workers	Two worker types Two job types Competitive search No firing costs Nash bargaining	* Pure temporary jobs emerge ** Wages for open ended larger	Garibaldi and Gomes (2022)
A2	Absent	Do workers take up bad fixed-term jobs to finance unemployment spells?	Mitigate borrowing constraint	Random matching Partial equilibrium Endogenous asset accumulation Short-term jobs as bad jobs	* Short- and long-term jobs contract coexist	Browning, Crossley, and Smith (2007)
A3	Absent	Do firms offer short term contract to sort workers?	Mitigate asymmetric information	Contract theory Two worker types Heterogeneous jobs Dynamic moral hazard No firing costs	* Short- and long-term jobs contract	Macho-Stadler, Pérez-Castrillo, Porteiro (2014)
B1	Assumed and inefficient	Effect of fixed-term on aggregate stocks and flows	Reduce EPL	Homogeneous worker Firing costs larger for open-ended contract	* Introducing fixed-term job leads to growth in employment conversion into open ended	Blanchard and Landier (2002), Boeri and Garibaldi (2007), Cahuc and Postel-Vinay (2002)
B2	Assumed and inefficient	Effect of fixed-term on stock, flows, and search effort	Reduce EPL	Incomplete markets General equilibrium Heterogeneous workers	* Temporary workers increase search effort ** Temporary workers reduce 2/3 welfare costs of employment protection	Alonso-Borrego, Fernández-Villaverde, and Galdón-Sánchez (2005); Alvarez and Veracierto (2012)

Continued

TABLE 2
THEORIES OF TEMPORARY EMPLOYMENT: TAXONOMY AND MAIN PREDICTIONS

Continued

Model	EPL	Research question	Role of temp	Environment	Main predictions	References
B3	Assumed and inefficient	Effects of fixed term on stocks, flows, and wages	Reduce EPL	Homogeneous workers Firing costs larger for open-ended contracts Nash bargaining	* Introduction of temporary contracts leads to duality and ambiguous effects on employment conversion into open ended ** Wages for open ended larger due to higher threat point in bargaining	Güell and Petrongolo (2007), Cahuc and Postel-Vinay (2002), Blanchard and Landier (2002), Wasmer (1999), Garibaldi and Violante (2005), Bentolila and Dolado (1994), Boeri (2011)
C1	Assumed and inefficient	Do fixed-term jobs amplify employment volatility?	Reduce EPL	Homogeneous workers Firing costs larger for open-ended contracts	Excess job destruction of temporary contract in recessions with aggregate shocks	Cabrales and Hopenhayn (1997), Bentolila et al. (2012), Holmlund and Storrie (2002), Caggese and Cuñat (2008)
C2	Assumed and inefficient	Do fixed-term jobs increase distortions?	Reduce EPL	Moral hazard Homogeneous workers Unobserved effort	* Temporary workers complementary with minimum wages ** Increased unemployment volatility and level	Güell and Rodríguez Mora (2010)
D1	Assumed and inefficient	Which workers are converted into permanent?	Reduce EPL	Heterogeneous workers	* Temporary trap and dead-end temporary jobs converted for high-productivity workers	Booth, Francesconi, and Frank (2002)
D2	Assumed and inefficient	Do workers on fixed term eventually catch up wages?	Reduce EPL	Learning about match quality	* Temporary workers' wages catch up with permanent workers.	Faccini (2014)

Continued

TABLE 2 *Continued*

THEORIES OF TEMPORARY EMPLOYMENT: TAXONOMY AND MAIN PREDICTIONS

Model	EPL	Research question	Role of temp	Environment	Main predictions	References
E1	Inefficient but politically viable	Are dual labor markets a political equilibrium?	Reduce EPL	Homogeneous workers Job destruction linear in flexibility. Job finding rate concave in flexibility	Median voter supports introduction of temporary contract with lower firing costs	Saint-Paul (1993, 1997, 2000); L'Haridon and Malherbet (2009)
F1	Assumed and inefficient	How and why do fixed and open-ended jobs coexist?	Reduce EPL	Heterogeneous jobs in duration Homogeneous workers	* Coexistence of temporary and open-ended jobs ** Only some jobs are converted	Cahuc, Charlot, and Malherbet (2016)
F2	Assumed and inefficient	How and why do fixed and open-ended jobs coexist?		Homogeneous jobs Directed search Heterogeneous outside option	* Coexistence of temporary and open-ended jobs ** Lower training for temps	Berton and Garibaldi (2012)
F3	Assumed and inefficient	How and why do fixed and open-ended jobs coexist?		Heterogeneous jobs Directed search Stock-flow matching	* Coexistence of temporary and open-ended jobs ** Lower training for temps	Smith (2007)

open-ended contracts in countries with strict employment protection?

The remainder of the paper presents a sufficiently broad theoretical framework and then addresses these issues from both a theoretical and an empirical perspective.

3. *Theories of Temporary Employment*

A large body of literature has provided theoretical explanations for the key issues raised in the previous section, or at least has provided a framework to discuss them.

The main strands of this literature are summarized in table 2. Most theories draw on models of the labor market with frictions. Indeed, frictions are essential to capture the key differences between temporary and open-ended employment. In frictionless labor markets, the firm profit maximization problem is a static one, and hence the firm hiring decision involves no dynamic considerations. In such a context, no difference exists between temporary and open-ended contracts. If the firm is subject to adverse business conditions, employment is immediately adjusted. One can thus argue that in frictionless labor markets, all contracts are temporary. Conversely, when adjustment costs play a role in the firm hiring and firing decisions, the employment decision is no longer static. Within the broad class of models with adjustment costs in the labor input, the models with matching frictions and search costs—in the spirit of Diamond, Mortensen, and Pissarides (Diamond 1982a, b; Mortensen 1982; Pissarides 1984a, b)[4]—generate pure economic rents, and hence represent a natural starting point for thinking about temporary and open-ended contracts. In basic matching models, a matched firm–worker pair enjoys a pure economic rent and continuing employment across periods avoids incurring search costs. For given business conditions and stable firm/worker outside options, the employment relationship is open ended and forward looking. In other words, even if the labor market operates under an employment-at-will doctrine and no firing costs are incurred, the employment relationship in matching models is open ended. No pre-commitment to a fixed duration of the job match exists.

The models with temporary contracts are strictly connected to the macro models of EPL. From a strictly economic-efficiency standpoint, in matching models with risk-neutral firms and workers, a mandated firing tax or severance payments upon job termination have no role. As column 2 in table 2 shows, most macro models with frictions and temporary contracts assume the existence of firing costs on open-ended contracts. These costs are treated as an immanent feature of labor markets, just like hiring frictions. No discussion is carried out about their desirability from an efficiency or equity standpoint.

As indicated by column 3 of table 2, the research questions this literature addresses involve investigating the labor market consequences of introducing contracts with shorter duration and no firing costs, alongside a stock of open-ended contracts with employment protection. More formally, and consistently with our proposed definition for temporary employment, temporary and open-ended (or permanent) contracts differ depending on the duration of the job and on the costs imposed to the firm when the job is severed. Terminating a contract involves costs F^j, where $j \in \{p,t\}$ refers to permanent or temporary contracts, respectively. In general, $F^p > F^t$, and in most models, $F^t \equiv 0$. Temporary jobs have shorter durations than open-ended jobs. When the temporary job comes to an end, the employer has

[4]We follow the convention of referring to this class of models as DMP models

an option to convert it into an open-ended employment relationship. The basic matching model with firing taxes implies a two-tier wage structure that was proposed by Mortensen and Pissarides (1999) and is best illustrated in a model developed in discrete time in the appendix. The model assumes Nash bargaining in the division of the surplus (with a fraction β that goes to the worker), a wage-setting mechanism that holds in most models surveyed in the paper. The basic wage structure in the simplest model with only permanent contracts distinguishes between an entry wage that applies to the first period of the permanent job (when firing taxes are not yet due) and a continuation wage that applies to the rest of the employment relationship (see the appendix for details that include also numerical simulations on the magnitude of the first period entry wage). If c^k is the search cost for temporary and open-ended jobs and $\delta < 1$ is the discount rate, the equilibrium job condition for the two jobs/contracts can be written as

$$\frac{c^k}{q(\theta^k)} = \delta(1-\beta)S^k;\ k \in \{p,t\},$$

where the left-hand side is the expected search cost necessary to fill a job position and the right-hand side is the fraction of the total surplus S^k that goes to the firm. The implications of Nash bargaining for wage differentials among workers employed with temporary and permanent contracts are discussed in section 5 as well as in the appendix. Under Nash bargaining, separations are always consensual. This makes firing taxes not justifiable from a worker standpoint.[5]

Matching models are the main, but not the unique, framework being used in investigating the role and effects of temporary contracts in imperfect labor markets. In particular, three main approaches somewhat alternative to search and matching environments can be identified.

The first approach treats temporary contracts as a component of a learning process about the true match quality (Jovanovic 1979). The second approach relates temporary contracts to asymmetric information with moral hazard (Shapiro and Stiglitz 1984). The third approach investigates temporary contracts in general equilibrium models with heterogeneous agents and firing costs in the spirit of Lucas and Prescott (1974) and Hopenhayn and Rogerson (1993). Note some of these features are embedded into matching models, hence these alternative models are somewhat coherent with an extended DMP framework. Yet, they propose economic mechanisms that are different from those of the search and matching literature. Moreover, some of the empirical implications of these alternative theories are different than those obtained based on a DMP framework.[6] While the studies using these alternative approaches are reviewed in the paper, the analytical framework provided in the appendix refers to papers framing matching frictions.

4. *Size and Evolution of Temporary Employment*

The framework presented in the previous section is useful to address the four main issues highlighted by the aggregate statistics. In this section, we begin with the

[5] Firing taxes can be inefficient in these models even when wages are fixed or collectively bargained and separations are demand driven. See, for instance, Boeri and Burda (2009).

[6] House and Zhang (2017) draw on models with adverse selection in the labor market (Akerlof 1970; Gibbons and Katz 2014), yielding predictions on the role of temporary contracts during recessions, similar to the matching literature (see section 5.3).

cross-country heterogeneity in the size and evolution of temporary contracts.

4.1 *Temporary Employment without Firing Costs*

Matching models and contract theory can rationalize the existence of a fringe of temporary contracts even when firing costs are negligible or nonexistent.

The pure temporary matching model is proposed by Garibaldi and Gomes (2022) in general equilibrium and by Browning, Crossley, and Smith (2007) in partial equilibrium, whereas Macho-Stadler, Pérez-Castrillo, and Porteiro (2014) rely on a contract-theory setting with dynamic moral hazard to investigate the strategic conditions under which firms offering short-term contracts emerge alongside long-term contracts.

In Garibaldi and Gomes (2022), workers may be forced to temporarily leave the labor market, and firms may consider offering a temporary job to a different worker rather than leaving the position vacant. In this pure temporary model, employment can be set at will and no institutional firing costs are incurred, so that $F^p = F^t = 0$ (see model A1 in table 2). The labor market is populated by two types of individuals: high- and low-productivity workers. High-productivity individuals yield product y^h, whereas low-productivity types yield y^l and $y^h > y^l$. Firms choose endogenously the capital intensity of their job, which ultimately depends on the type of worker employed. The capital intensity is either k^h or k^l where $k^h > k^l$, and the corresponding productivity on the job depends on the match, so that three productivity levels are possible, p^h, p^l, p^t, where p^h refers to high-productivity workers matched to firms with high capital, p^l is low-productivity workers in firms with low capital, and p^t is low-productivity workers in a firm with high capital. The outside option of the individuals when they are out of work is subject to shocks, and workers have to temporarily leave the labor force. Three submarkets emerge in equilibrium. First, jobs matching low-skill workers with low-capital firms are destroyed when workers leave the job. Second, when capital-intensive firms match with high-skill workers and are hit by a temporary shock, employers face a key economic decision. They can freely destroy the job; they can temporarily leave the job in "mothballs," incurring the costs of the idle capital while the worker is absent; or they can look for a temporary worker and keep the seat warm, maintaining the existing capital. When the latter option is optimal, a third submarket of temporary jobs emerges in equilibrium. Which workers do these jobs attract? Only low-skill workers are willing to search in this market; they are overemployed, in the sense that they are paired with too much capital. In the calibration to the US labor market, Garibaldi and Gomes (2022) show that contingent temporary workers represent 2.7 percent of the total employment, and this share is robust to changes in key parameters. Their wages are 18 percent lower than those of noncontingent workers, but they are higher than those of noncontingent and low-skill workers. The higher wage, associated with being employed in high-capital jobs, is offset by longer job queues and a shorter match duration.

In Browning, Crossley, and Smith (2007), matching is random, but access to credit is limited. The authors assume bad temporary jobs are readily available, whereas good permanent jobs require time-consuming search (see model A2 in table 2). The main result of the paper is that a (partial) equilibrium of the labor market exists in which risk-averse unemployed with very low assets take up bad temporary jobs and eventually quit to unemployment when assets grow, and they search for long-term jobs. Although firms do not play any role in this model, in the cyclical

equilibrium, temporary and permanent jobs coexist without explicit firing costs. The main mechanism is financial market imperfections coupled with the possibility of finding bad temporary jobs very quickly.

The more formal contract-theory literature, in the spirit of Malcomson and Spinnewyn (1988), shows that in an asymmetric-information setting with dynamic moral hazard and credible commitment, long-term contracts between a firm and a worker represent the efficient contract even without firing costs and in a setting where employment-at-will prevails. Macho-Stadler, Pérez-Castrillo, and Porteiro (2014) show that with heterogeneous firms (in terms of productivity) and workers (in terms of ability), equilibria are generated in which short-term contracts emerge alongside long-term contracts (see model A3 in table 2). The short-term contracts are offered by high-productivity firms to high-ability workers and by low-productivity firms to low-ability workers. Although the authors do not aim to back up empirical phenomena, their contribution confirms that double-sided heterogeneity is a key ingredient for modelling purely temporary jobs.

4.2 *Temporary Employment and Contractual Dualism with Firing Costs*

The standard approach to frame temporary employment is to introduce fixed-term contracts in a model in which open-ended contracts are subject to mandatory firing costs. The benchmark model of this type contains no worker heterogeneity, all jobs are open ended, and a firing tax F^p must be paid by the firm outside the match (to a third party, i.e., a lawyer) when the job is destroyed. Employment protection is modeled as a tax rather than as a transfer (e.g., a severance payment from the employer to the employee) since the latter, with endogenous wages, would be internalized in the bargaining process and not affect the equilibrium market tightness, as shown by Garibaldi and Violante (2005). The key features and implications of this class of models are described in model B1 of table 2. If productivity is sufficiently high, the job is viable. Firing taxes are paid when the jobs are destroyed for exogenous reasons at the rate λ.

Suppose now that temporary contracts are introduced in this environment. Temporary contracts allow the job to be destroyed at no cost for an expected period of time equal to $1/\rho$, where ρ is set by the regulation and refers to the average period for which jobs can be terminated at no cost when ρ strikes. The conversion option and the type of contract to be offered are among the key decisions of firms. When the temporary job ends, firms have the option to convert the contract into an open-ended contract at a cost ξ. From that moment onward, firing costs are due. The conversion of temporary into permanent jobs in matching models is studied in detail by Blanchard and Landier (2002), Cahuc and Postel-Vinay (2002), and Garibaldi and Violante (2005). The technological dimension of the costs of conversion is arguably small. Yet, it is an institutional feature associated with the legislation, because temporary jobs have a limited duration. Although the modeling of a stochastic arrival rate of the duration ρ is formally very useful, in real-life labor markets temporary jobs can typically be renewed a fixed number of times and for a maximum cumulative duration. The appendix shows that the surplus from a temporary job reads

$$S^t = \frac{y - (1-\delta)U + \rho\delta(1-\lambda)\max\{S^{pe} - \xi, 0\}}{1 - \delta(1-\lambda)(1-\rho)},$$

where the max operator highlights the key condition for the conversion of the job into an open-ended position; $(1-\delta)U$ is the permanent income of the unemployed, a natural measure of welfare in matching models.

A key result of this simple model is that when permanent jobs are viable and converting the job at the expected duration is optimal, the joint surplus from a temporary contract job (S^t) is larger than the joint surplus at entry from a permanent contract job (S^{pe}), and any new vacancy is posted as a temporary job. In this environment, job creation and market tightness for temporary jobs increase (thus $\theta^t > \theta^p$) with respect to an economy with only open-ended jobs. Note that in this context, all new hires will eventually occur in temporary jobs, and at the steady state, no jobs are open ended.

An additional result arises when temporary jobs are introduced in an economy with a stock of open-ended jobs. At the time of the introduction of temporary contracts, the stock of existing jobs is destroyed at the rate λ, whereas new jobs are created by the higher job-finding rate $\theta^t q(\theta^t)$. Thus, employment increases. The latter effect is the so-called honeymoon effect associated with the introduction of temporary contracts (Boeri and Garibaldi 2007).

Whereas matching models focus mainly on the job creation condition and the conversion option, general equilibrium models with incomplete markets and heterogeneous households and firms highlight an additional channel through the search behavior of workers. Alonso-Borrego, Fernández-Villaverde, and Galdón-Sánchez (2005) study temporary employment in a general equilibrium model with firing costs in the spirit of Hopenhayn and Rogerson (1993). They develop a model in which households work, search, and consume subject to a set of allowed labor contracts and a borrowing constraint, whereas firms maximize profits. The presence of firing costs transforms the firm problem into a nontrivial intertemporal optimization. The crucial channel emphasized by Alonso-Borrego, Fernández-Villaverde, and Galdón-Sánchez (2005) is the link between contract type and search intensity (see model B2 in table 2). If temporary contracts are outlawed, households search more intensively because the pool of jobs being offered improves: instead of most of them being temporary positions, all jobs are now permanent. Permanent jobs are preferred because they pay a higher wage, generate severance payments in case of firing, and provide higher job security. Thus, these models imply that *temporary jobs reduce job creation through a search intensity effect*. Moreover, *the elimination of temporary labor contracts decreases the flows into unemployment*. Firms fire temporary workers as a response to a negative shock without incurring sizeable severance costs. When temporary labor contracts are not allowed, firms are forced to smooth their employment level over time to reduce their firing costs (see also section 5.3 on this issue).

The role of firms' heterogeneity in general equilibrium matching models is analyzed by Alvarez and Veracierto (2012) (see model B2 in table 2). They study temporary contracts and firing taxes in an island economy that is modeled in the spirit of Lucas and Prescott (1974). They solve the theoretical model under both a laissez-faire equilibrium with undirected search à la McCall (1970) and a firing-tax equilibrium coherent with Hopenhayn and Rogerson (1993). Alvarez and Veracierto (2012) consider the case of Spain in the mid-1980s, which introduced temporary contracts in a labor market characterized by large firing costs. They show, in a calibrated version of the model, that temporary contracts of three years' duration (roughly the length of the contracts introduced in Spain) close about half of the welfare gap between the firing tax and the laissez-faire cases. These calibrations bring macroeconomic considerations into an otherwise micro-oriented literature. More work is warranted to develop empirically oriented job search

and bargaining models generating labor market outcomes under vastly different institutional configurations, recovering the underlying structural parameters. An example of this approach applied to the analysis of the effects of the minimum wage is Flinn (2011).

4.3 *Evidence on the Two Facets of Temporary Employment*

The models outlined above suggest two facets of temporary employment exist.

The first is a physiological component of temporary employment related to the transitory replacement of job holders, allowing the employer to save on the costs of opening and filling a vacancy. The number of these contingent worker positions mainly depends on demographic factors (e.g., the number of workers who are new parents). The calibration of Garibaldi and Gomes (2022) for the United States suggests this component of temporary employment should be roughly of the order of 3 percent of dependent employment. These temporary replacement contracts generally involve relatively low-skill segments of the workforce and tasks that do not require substantial training to be carried out.

Labor force surveys do not provide measures of temporary replacement employment. These jobs are generally proxied in the literature by workers with short employment spells or contingent workers, even though some of these short spells may be accounted for by workers on open-ended contracts that immediately quit and/or are fired. Hall and Kudlyak (2020), drawing on Current Population Survey (CPS) data and defining long- and short-term jobs as different labor market states, show a short-employment-spell market is mainly composed of a subset of individuals who move frequently between employment and unemployment. In the estimate of the transition matrix across states, Hall and Kudlyak (2020) find short-term employment accounts for 5 percent of the male population and 6.7 percent of the female population. The Bureau of Labor Statistics (BLS 2018) carries out a specific survey to estimate the level of wage and salary workers who expect that their jobs will last for less than a year and report them as temporary or "contingent" workers. This definition does not include workers who do not expect to continue in their jobs for personal reasons, such as retirement or returning to school. According to the BLS, between 1.3 percent and 3.8 percent of employment in the United States belongs to this category.

The second component of temporary employment envisaged by these models is proportional to the strictness of the employment protection provided to workers with an open-ended contract. This type of temporary employment offers a margin of flexibility to firms. Thus, in countries with low costs of dismissals from open-ended contracts, temporary employment should be mainly of the first type, a contingent or replacement employment, substituting workers on leave, or a contractual arrangement covering jobs that are, by nature, of limited duration, such as seasonal jobs. In the countries with strict employment protection, both components should instead be present at the same time and hence the share of dependent employment with temporary contracts should be higher in "rigid" labor markets.

Figure 4 displays the cross-country correlation between the incidence of temporary employment (share of temporary contracts in total dependent employment, vertical axis) and an OECD measure of the strictness of employment protection of permanent contracts for the last year in which data are available. The OECD index[7] is increasing in the costs of dismissals from open-ended contracts. The correlation

[7] See OECD (2020) for details.

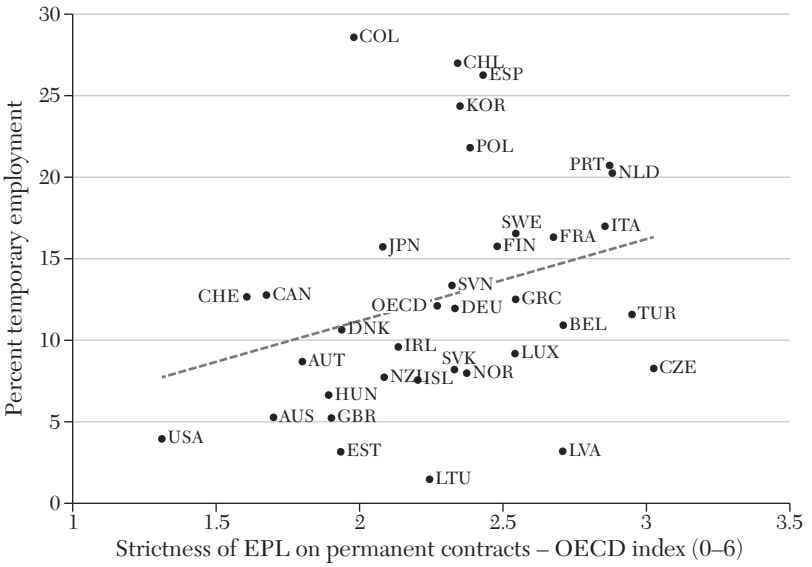

Figure 4: Temporary Employment and Strictness of Employment Protection Legislation for Open-ended Contracts

Notes: This figure displays, for each country, the OECD index of strictness of EPL on permanent contracts (*x*-axis) and the fraction of temporary employment over total dependent (salary and wage earners) employment (*y*-axis). The dotted line is the prediction of a linear regression of the EPL index on the fraction of temporary employment. The strictness of EPL is measured according to the latest revision of the OECD EPL index, combining information on procedural requirements, notice and severance payments, the regulatory framework for unfair dismissals, and its enforcement. Data from 2017 for the United States and Australia, 2019 data for remaining countries. For a listing of country codes, see the notes to figure 2. Label OECD marks the (unweighted) average data for all OECD countries.

Source: OECD (2021a, 2024).

between the two variables is .29 and is significant at 90 percent confidence levels. Notice this correlation can be attenuated by the fact that countries with strict employment protection for permanent workers tend to have in place strong restrictions to the expansion of temporary employment (see section 7 below).

Can this correlation be interpreted as a causal effect of regulations related to the costs of dismissal on the decision of firms to use temporary contracts?

A number of studies have investigated specifically the relationship between the strictness of EPL for open-ended contracts and the spread of temporary employment, drawing on natural experiments to make causal inferences. Hijzen, Mondauto, and Scarpetta (2017), using a regression discontinuity design around the 15-employee threshold in Italy, find stricter EPL significantly increases hiring under fixed-term contracts. A problem with identification strategies based on firm-size thresholds is that the size of firms is endogenous. Moreover, relevant spillovers—for example, in terms of matching externalities—may exist between firms located above and below the threshold, also

exposing de facto to the treatment firms that formally are exempted from the regulatory changes (Cahuc et al. 2022). Centeno and Novo (2012) analyze the effects of a reform in Portugal that increased the strictness of EPL for workers with open-ended contracts, finding it induced a boost in hiring under fixed-term contracts.

Another theoretical prediction is that temporary employment of the replacement type should involve mainly low-skill components of the workforce. The reason is that worker heterogeneity, when combined with job heterogeneity, may give rise to assortative matching, where highly qualified workers have permanent jobs and low-qualified workers have temporary jobs. The most common profile of contingent workers in the United States includes women, students, minorities, immigrants, and unorganized low-skill and low-wage workers (Erickcek and Houseman 1997). Welfare recipients are also overrepresented among temporary workers in the United States (Heinrich, Mueser, and Troske 2005).

This composition of replacement temporary employment may also explain why these jobs often are not converted into open-ended contracts. Single-quarter jobs in the United States have been studied in detail by Hyatt and Spletzer (2020), who document that they are not stepping stones to longer and more stable employment relationships. Morchio (2020) uses the National Longitudinal Survey of Youth and finds a subset of unemployed youth are characterized throughout their career by a very large separation rate on the job and shorter employment spells.

5. *Contractual Dualism*

Models of contractual dualism, where temporary employment is a response to strict employment protection, have a number of implications regarding wage setting, labor market segmentation, and the cyclical behavior of temporary employment. These implications differ across models, generally depending on how the conversion of fixed-term into open-ended contracts is treated.

5.1 *Dual Wage Structures*

In terms of wage structures, matching models with homogeneous workers and dual contracts have a clear prediction: when wages are the outcome of a simple Nash bargaining problem, in the presence of fixed-term contracts we should observe a two-tier wage structure with temporary workers experiencing, ceteris paribus, a wage penalty vis-à-vis workers with permanent contracts (Cahuc and Postel-Vinay 2002, Blanchard and Landier 2002, Wasmer 1999, Bentolila and Dolado 1994).

This two-tier wage structure arises from a different threat point of workers and employers in the two cases. Assume for simplicity that firing costs are zero when the job is temporary, whereas $F^p > 0$. If workers start in temporary jobs and jobs are then converted into permanent contracts, *with the exception of the conversion period, open-ended jobs pay higher wages than temporary jobs* because the firing tax is the threat point of the bargaining game (see model B3 in table 2, Garibaldi and Violante (2005), Boeri (2011), and analytical details in the appendix). The corresponding wages of temporary (w_t) and permanent (w_p) contract workers read respectively

$$w_t = \beta y + (1-\beta)(1-\delta)U; \quad \begin{matrix}\text{temporary}\\ \text{phase}\end{matrix}$$

$$w^p = \begin{cases} \beta y + (1-\beta)(1-\delta)U - \lambda\beta F^p; \\ \quad \text{period of conversion} \\ \beta y + (1-\beta)(1-\delta)U + \beta(1-\delta)F^p; \\ \quad \text{continuation wage} \end{cases}.$$

The wage structure presented above also implies that wages in temporary contracts experience a one-period reduction at the time of conversion (see the appendix for a formal derivation). This result is coherent with the models of Mortensen and Pissarides (1999) and Garibaldi and Violante (2005), and can be interpreted as a prepayment by the worker of the security that she/he acquires moving to a permanent job. It operates like a Lazear-type bonding scheme (Lazear 1990), although the focus here is on firing taxes rather than transfers (or severance) from the employer to the worker, hence only part of the employment protection is paid in advance by the worker in terms of a lower wage.[8] While the evidence reviewed in the rest of this section is coherent with a permanent contract wage premium, very little research has been carried out on the prediction of a one-period conversion penalty in the wage profile. Theoretically, one way to reduce the wage fall at the time of the conversion is to allow the bargaining power of workers, β, to increase immediately when moving from a fixed-term to an open-ended contract.

The prediction that open-ended jobs pay, on average, higher wages than temporary jobs $\left(w_p > w_t\right)$ is confirmed by microdata. Boeri (2011) estimates Mincer-type wage regressions augmented by contractual status in EU countries, drawing on the European Community Household Panel (ECHP) and its successor, the EU Survey on Income and Living Conditions (EU-SILC). He finds that, controlling for gender, education, and experience, temporary workers experience a 20 to 40 percent wage penalty vis-à-vis permanent contract holders, but only in countries with strict employment protection for permanent contract holders. In the United Kingdom, for instance, a country with low employment protection, the wage premium of permanent versus temporary contract holders is only on the order of 6.5 percent. Similar results are obtained by Cazes and de Laiglesia (2015), who look at wage distributions for temporary workers in EU countries, drawing on the European Working Conditions Survey (EWCS). Dias da Silva and Turrini (2015), based on the European Structure of Earnings Survey, find the wage premium of open-ended vis-à-vis fixed-term contracts is higher for men, workers in central age groups, with middle levels of education, and performing non-elementary occupations.

These results may be due to self-selection and unobserved heterogeneity across workers. They also capture correlations and are not informative about causality. Leonardi and Pica (2013) find direct evidence of the wage differential generated by contractual dualism, drawing on evidence from the 1990 labor market reform in Italy that increased employment protection for small firms. In particular, they find wages of incumbent workers increased vis-à-vis those of new entrants. This result is confirmed by Daruich, Di Addario, and Saggio (2023), who exploit the staggered collective bargaining agreements in Italy that allowed for the spread of temporary contracts to make causal inferences regarding the effects of dual-track reforms on wage setting. Lee and Lee (2015), drawing on the Korean Labor and Income Panel Study, linked to industry-level offshoring data, find that benefits from globalization in South Korea in terms of higher pay are enjoyed only by permanent contract holders, leaving aside fixed-term contract holders.

Results in countries with low employment protection are different: Laß and Wooden (2019), using unconditional quantile regressions to estimate the wage effects of temporary employment, find fixed-term contract workers are paid like permanent contract holders. Only casual workers are paid less.

[8] The appendix shows also that at the time conversion—when the firing tax starts operating—the worker experiences a one-period loss in lifetime utility.

As discussed in section 4, self-selection of unskilled workers into temporary employment is relevant in countries with low levels of employment protection, in line with predictions of search and matching models of the labor market in the presence of a double heterogeneity (of workers and job contracts). Thus, in the presence of low levels of employment protection, we should expect to observe (unconditional) differences in pay between permanent and temporary workers related to the overrepresentation among temporary employees of relatively low-qualified segments of the workforce. Segal and Sullivan (1997), based on Current Population Survey (CPS) data, find two thirds of the wage gap with respect to permanent contracts in the United States can be explained by individual and job characteristics. The presence of many low-skill workers in temporary positions also contributes to explaining the difficulties these workers face in obtaining stable employment, which Autor and Houseman (2010) document.

5.2 *Dualism and Market Segmentation*

The simple model with homogeneous workers presented in section 4.2 yields different predictions when converting the newly created temporary jobs into permanent contracts is not optimal. These conditions are studied in detail by Güell and Petrongolo (2007) and are analyzed by model type B3 of table 2. When the conversion is not optimal, temporary jobs involve a larger job destruction rate than permanent contracts, because job destruction for temporary jobs is $(\lambda + \rho)$, whereas for permanent contracts it is λ. Although the effects of the introduction of temporary contracts on job destruction are unambiguous, the shift from a rigid economy with only permanent contracts to a flexible economy with only temporary and flexible contracts that are not converted into open-ended jobs yields ambiguous effects on total employment. The flexible economy is more efficient and experiences higher job creation, but its jobs experience higher turnover and in steady state the total impact on employment is ambiguous (Cahuc and Postel-Vinay 2002, Blanchard and Landier 2002, Wasmer 1999). The job creation and job destruction effects are also present in the immediate aftermath of the introduction of temporary contracts, even though the job creation effect may initially dominate the job destruction effect, since the stock of existing open-ended jobs is destroyed at the rate λ. As a result, this kind of model also generates a honeymoon effect (Boeri and Garibaldi 2007). From a macroeconomic perspective, temporary employment creates congestion in the labor market because of the higher turnover it induces, which may lead to higher unemployment (Blanchard and Landier 2002).

5.3 *What Happens during Recessions?*

The theoretical literature outlined the possibility that temporary jobs act as a buffer stock for permanent jobs (Cabrales and Hopenhayn 1997, Bentolila et al. 2012, Holmlund and Storrie 2002). This implication can be obtained by extending the search and matching models to include aggregate shocks and the effects of recessions, as in model type C1 in table 2. Assume jobs are created as temporary jobs and the productivity y^k fluctuates from y^g to y^b at frequency μ, where b refers to bad aggregate business conditions and g to good aggregate business conditions, so both temporary jobs and all macro variables are indexed by the aggregate condition $k \in \{g,b\}$. The most interesting specification of the model is one in which temporary jobs are converted into open-ended jobs in good times, whereas they are destroyed at maturity in bad business conditions. In this case, all temporary jobs act as buffer stock and the increase in unemployment during downturns is driven by the fall of temporary jobs. In

other words, in recessions excess job destruction occurs, driven by temporary contracts that are not converted into permanent positions. Caggese and Cuñat (2008) study the interaction of fixed and open-ended contracts in a partial equilibrium setting where the two types of contracts are imperfect substitutes in production and firms face financial constraints. They also show that in this context, employment volatility increases when firms more extensively use temporary contracts.

Models with moral hazard also predict a larger volatility of temporary employment over the business cycle, notably when temporary employment is paid at levels close to the minimum wage. For instance, Güell and Rodríguez Mora (2010) study temporary employment in the context of efficiency wages (Shapiro and Stiglitz 1984). Workers' effort is not perfectly observable and is required by all workers to the same degree. In this setting, the wage solves the worker's incentive compatibility constraint (see model type C2 in table 2). The contract duration acts in these models as an additional source of incentives, which can become relevant with the introduction of a sufficiently high minimum wage. With a binding minimum wage, the incentive problem highlighted by Güell and Rodríguez Mora (2010) implies an endogenous role for temporary contracts, and the instrument that allows the provision of incentives in temporary contracts is their renewal rate into permanent contracts. In the absence of a minimum wage, the effects of firing costs could be undone through lower wages for temporary contracts. Minimum wages prevent employers from charging the severance payment to the workers through lower wages. In terms of predictions, Güell and Rodríguez Mora (2010) imply that temporary contracts increase unemployment fluctuations.

Empirical evidence is consistent with these predictions. Estimates of Okun's law regarding employment to output elasticities (IMF 2010; Boeri 2011; Ball, Leigh, and Loungani 2017) unambiguously suggest a higher incidence of temporary employment makes the relationship between unemployment and output steeper in each country. This concentration of labor market risk on temporary employment was particularly visible during the Great Recession of 2008–09, and similar developments took place during the COVID-19 recession in Europe. Employment to nonemployment transitions are up to six times larger for fixed-term contracts than for permanent contracts during downturns. This effect also originates from excess job turnover in firms (Centeno and Novo 2012) and underinvestment in human capital (Charlot and Malherbet 2013).

This general finding is supported by country-level analyses. For example, Bentolila et al. (2012) compare the labor market response in France and Spain during the Great Recession, and Bartosik and Mycielski (2020) analyze the cyclical behavior of employment in Poland, the European country, together with Spain, with the largest incidence of temporary employment. Holmlund and Storrie (2002) report with reference to Sweden that a recession is associated with an initial decline in temporary employment followed by a sharp rise throughout the recession because firms during recoveries are less willing to offer open-ended contracts and workers are more prone to accept fixed-term contracts.

A stock-flow adjustment in the use of temporary contracts can also occur during cyclical fluctuations. Boeri and Garibaldi (2007) investigate the transitional effects of two-tier reforms. They find that countries that introduced flexibility at the margin experienced an increase in the employment content of growth after the reforms, and that temporary contracts (including fixed-term contracts) accounted for a large component of the jobs created after the

reforms. The other side of the coin of this honeymoon effect is a decline in labor productivity. Boeri and Garibaldi (2007) look at the employment behavior of approximately 1,000 Italian firms between 1995 and 2000 and find a sizeable negative effect of temporary contracts on productivity growth at the firm level.

6. *Careers of Temporary Workers*

As shown in section 2, macro evidence suggests the incidence of fixed-term employment is significantly higher among young workers than along the rest of the age distribution, particularly in countries with strict EPL for workers with open-ended contracts.

This observation induced many scholars, starting with Booth, Francesconi, and Frank (2002), to investigate whether temporary contracts are dead ends (the term used by the literature) or offer a port of entry into permanent employment. From a theoretical perspective, this issue can be addressed by positing that worker heterogeneity exists in terms of productivity, notably that the population contains two types of workers that have different productivity levels (high- and low-productivity workers), as in model type D1 in table 2. In this class of models, worker quality is observed by the firms only after the meeting between a firm and a worker.[9] Assuming s^h high-productivity workers and $1 - s^h$ low-productivity workers are present, that vacancies are posted in the market as temporary jobs with an option of being converted, and that high-productivity workers have a flow productivity $y^h > y^l$, an obvious equilibrium configuration is one in which temporary jobs are converted into permanent jobs when filled by high-productivity workers. Under a formal condition established in the appendix, temporary jobs are thus a dead end for low-productivity workers. This model is particularly relevant for young workers, whose entrance in the labor market is typically driven by temporary contracts. This equilibrium configuration implies a fraction of the labor force work almost permanently with temporary contracts, while other workers move into open-ended and stable jobs. Whereas low-productivity workers only have access to a secondary labor market of fixed-term contracts offering low employment protection and low wages, high-productivity workers succeed in having their contract converted into a permanent contract at expiration.

Models with temporary employment as a screening device (model type D2 in table 2) imply instead that temporary jobs are either destroyed or converted into permanent jobs at expiration. In particular, models of learning about match quality generally predict that temporary jobs are a port of entry, regardless of the skill of the workers involved. For instance, Faccini (2014) assumes the productivity of workers is observed only imperfectly and that separations are driven by a process of learning about match quality (Jovanovic 1979). As a result, firms use temporary contracts to screen workers for permanent positions. The model extends the matching framework of Pries and Rogerson (2005) by introducing the possibility for the firms to offer both temporary and permanent contracts. Faccini (2014) assumes firms can offer a temporary contract with an exogenous probability, which depends on the strictness of labor market regulations. A further assumption is that firing costs are only associated with the termination of a permanent job. As in Pries and Rogerson (2005), Faccini (2014) assumes firms get acquainted with worker characteristics only in the aftermath of a full meeting. Specifically, at the time of matching both the employer and

[9] This requirement is the labor market equivalent of experience or inspection goods, i.e., goods whose quality is observed only upon consumption.

the worker receive a signal about the true quality of the match and the relationship is formed only if this signal exceeds a certain threshold. If the match is formed, both parties learn about the true quality of the match over time and unsuitable matches are destroyed. Temporary contracts are subject to a nonrenewal clause. Upon expiration, a temporary match that is expected to be sufficiently good is upgraded to a permanent position. In a framework where most of the separations at short tenures are driven by learning about match quality, temporary contracts increase the value of posting vacancies because they allow workers to be screened on the job without incurring any cost if a bad match is terminated. They represent, in other words, a sort of extended probationary period. The model predicts that workers starting their career in temporary positions are expected to catch up over time with the wages of workers starting in permanent positions, and that temporary contracts act as a port of entry (Booth, Francesconi, and Frank 2002)

6.1 *Evidence from Longitudinal Studies*

An extensive micro empirical literature examines whether temporary employment is a stepping stone to stable employment or an absorbing employment state, and whether the transition from fixed-term to open-ended contracts involves changes in wages, access to training, and, more broadly, better working conditions.

Booth, Francesconi, and Frank (2002) make a pioneering contribution to this avenue of research. They analyze temporary employment in the United Kingdom, drawing on the Household Panel Survey, showing temporary employment receives less pay and less formal training. However, women who start in fixed-term employment and move to permanent contracts fully catch up in wages with those who start in permanent jobs. Stancanelli (2002) reports similar results drawing on the European Community Household Panel (ECHP) data covering 12 EU countries. Heinrich, Mueser, and Troske (2005), in line with Booth, Francesconi, and Frank (2002), find that temporary employment involves lower initial wages than those with jobs in other sectors, but faster subsequent wage growth. Based on Finnish Quality of Work Life Surveys (QWLS), Kauhanen and Nätti (2015) find that temporary employment offers lower employer-funded training, fewer career possibilities, fewer opportunities to learn and grow at work, and less job autonomy than permanent employment. Damiani, Pompei, and Ricci (2016), on the basis of industry-level data for 14 countries, find the deregulation of temporary employment is negatively correlated with productivity growth, presumably because it discourages on-the-job training and the acquisition of firm-specific skills. This finding is supported by the PIAAC (Programme for the International Assessment of Adult Competencies) data on skill acquisition over a working career: temporary workers tend to accumulate a gap vis-à-vis workers with open-ended contracts (Kahn 2018). Ferreira, de Grip, and van der Velden (2018), however, suggests this gap can be partly compensated by more engagement in informal training by temporary workers willing to be confirmed at the end of their contract.

García-Pérez, Marinescu, and Castello (2018) document that fixed-term contracts in Spain ease the entry of younger people into the labor market but have negative consequences on their career prospects. De Graaf-Zijl, van den Berg, and Heyma (2011) find temporary employment is a stepping stone to open-ended employment in the Netherlands.

Givord and Wilner (2015) look at career prospects of fixed-term and temporary work agency contracts, drawing on French

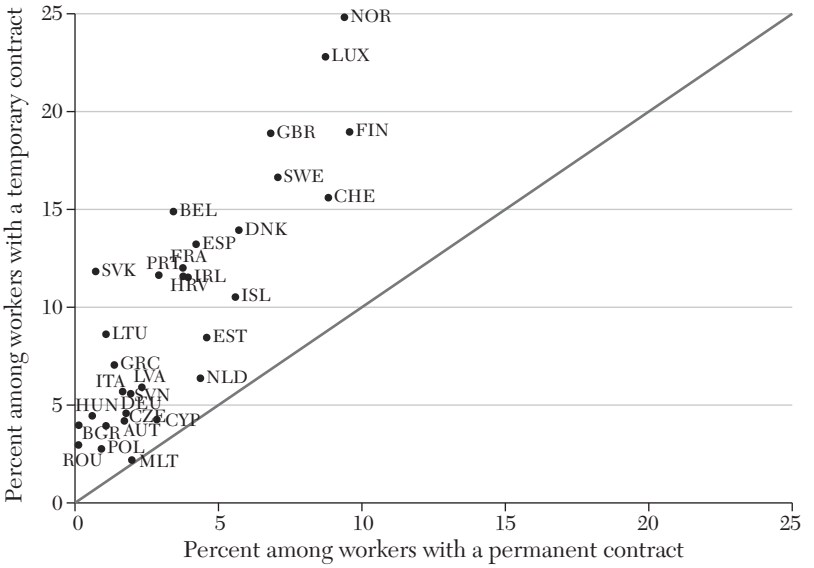

Figure 5. Incidence of On-the-Job Search among Workers with Open-ended and Temporary Contracts

Notes: The incidence is computed for each country as the fraction of workers with a permanent (*x*-axis) or temporary (*y*-axis) contract who declared they were looking for another job when interviewed. The 45-degree line is also reported. For a listing of country codes, see the notes to figure 2.

Source: Eurostat (2020).

data over the 2002–10 period. They find fixed-term contracts generally offer a "stepping stone" to permanent positions, whereas temporary agency work is more of a dead end. Picchio (2008), based on data from the Italian Survey of Household Income and Wealth, reports that fixed-term contracts increase the probability of moving to permanent contracts with respect to unemployment status.

Career opportunities of temporary workers also seem to be affected by task complexity. Reichelt (2015), analyzing retrospective data for Germany, finds temporary jobs are a bridge to permanent employment in the case of medium-skill work. By contrast, the risk of a transition to unemployment is generally equal but increases for employees performing low- and medium-skill tasks if local labor demand falls. Only high-skill jobs seem to be unaffected by the labor market environment.

Filomena and Picchio (2022) carry out a meta-analysis of 64 articles on temporary employment. They report that about one-third of them find temporary employment is a stepping stone, another 23 percent obtain mixed results, and the remaining 45 percent conclude temporary employment is a dead end. Among the factors that are more likely to induce a strong segmentation in labor markets is the degree of self-selection into temporary employment and cyclical conditions. Temporary employment is more of a stepping stone when adequate control is in place for self-selection and when unemployment is lower.

Overall, the empirical literature reports both cases in which temporary employment

is a stepping stone to open-ended contracts and cases in which it becomes a dead-end job. The outcomes depend on the characteristics of workers involved and the underlying macroeconomic conditions. The strictness of employment protection is also important. Ceteris paribus, countries with relatively low EPL are less prone to generate segmented labor markets than labor markets with strict EPL.

An empirical finding that is common to all longitudinal studies we are aware of is that search intensity is consistently larger among temporary workers than open-ended contract holders. Figure 5 provides a visual characterization of this result, updating results obtained by Kahn (2012) based on the ECHP survey.

Evidence shows temporary employment is associated with a higher risk of workplace accidents than permanent employment (Guadalupe 2003), either because temporary workers are less experienced and trained (Pouliakas and Theodossiou 2013, Bena et al. 2013) and they work longer hours than the other workers, or because they are assigned more dangerous tasks within the firm (Amuedo-Dorantes 2002, Picchio and van Ours 2017). In other words, temporary workers have a problem of both experience and of bargaining power.

Temporary employment affects not only the careers of individuals, but also family planning. Landaud (2021), using French data on the work and family history of young adults, find about half of the increases in age at first cohabitation and at first child can be explained by the rise in unemployment and in the share of temporary jobs among young workers. Uncertainty related to employment insecurity would seem to be the main factor behind the lower levels of well-being reported by temporary workers vis-à-vis workers with open-ended contracts in the British Household Panel Survey. Dawson, Veliziotis, and Hopkins (2017). Clark and Postel-Vinay (2009), based on ECHP data, document that temporary workers consistently feel less protected than permanent contract workers in EU countries, and that this gap is increasing in the strictness of EPL for permanent contracts.

Virtanen et al. (2005) review evidence from 27 studies on the consequences of temporary employment on health status and find an association between temporary employment and psychological morbidity. Aronsson, Gustafsson, and Dallner (2002), based on a representative survey of the Swedish workforce, report poorer health status of fixed-term than of permanent job holders.

7. *The Future of Temporary Employment*

7.1 *Dual Track Reforms*

As documented in section 2, national EPL evolved by expanding significantly the scope of temporary employment while leaving the strictness of EPL for open-ended contracts mostly unchanged. This finding is confirmed by the detailed analysis of reforms in different countries (Boeri 2011). Saint-Paul (1993) pioneered the literature explaining these dual-track reform trajectories, showing that incumbent workers employed in open-ended jobs would not politically support a permanent reduction of firing costs. Saint-Paul (1993) makes two assumptions, summarized in model E1 in table 2. First, he assumes the destruction rate is a linear function of labor market flexibility s, $\lambda = \lambda_0 s(F^p)$, where flexibility is an inverse function of firing costs of permanent workers. Such an assumption is coherent with most models with endogenous job destruction, à la Mortensen and Pissarides (1994). Second, he assumes the job-finding rate is an increasing and concave function of flexibility $(\theta^p q(\theta^p) = \log(1 + s(F^p)))$. Under these two assumptions, the median employed voter does not support a reduction in firing costs.

Yet, the median voter would not veto a reduction of firing costs only for new temporary jobs. This repositioning of the median voter is the basis of the political economy equilibrium with contractual dualism. This mechanism is developed further in Saint-Paul (1997, 2000) and L'Haridon and Malherbet (2009). A two-tier reform can also get the support of the employed persons, who anticipate a higher probability of rehiring in case of job loss.

7.2 *Coexistence in the Long Run of Temporary and Permanent Contracts*

Models of contractual dualism type B1 and B3, as well as models of political economy, such as E1, in table 2, imply that in steady state, new hires by temporary employment cover the entire employment pool. However, in real-life labor markets, temporary contracts do not overtake open-ended contracts. As we discuss below, sometimes regulations prevent employers from offering too many fixed-term contracts, but these constraints are not always binding.

A more recent strand of literature has tried to explain why, in real labor markets, temporary and permanent contracts coexist at the steady state (Cahuc, Charlot, and Malherbet 2016; Berton and Garibaldi 2012; Smith 2007). Cahuc, Charlot, and Malherbet (2016) introduce cross-sectional heterogeneity in the duration of jobs (see model F1 in table 2). Firms have similar productivity but are heterogeneous with respect to the duration of the job, so that some jobs stop being productive earlier than other jobs, whereas workers are homogeneous. Even though a continuum of technological durations, λ, exists, the legislation allows for only two types of labor contracts: permanent or temporary. When a permanent job stops being productive, it can be terminated only at a cost F^p. When a temporary job stops being productive, it is not subject to any institutional firing cost, even though the firm has to pay the wage until the term date of the contract. In addition, when the temporary job comes to an end, firms have the option of converting the job into an open-ended contract by paying a small cost ξ. The trade-off faced by the firm when choosing between a temporary or a permanent contract concerns the probability of avoiding either the firing costs F^p or the conversion cost ξ. If the technological duration of the job is sufficiently long (and thus λ sufficiently low) the firm will open a permanent job. This literature shows that the main decision of the firms, in terms of contractual duration, is governed by a reservation rule, so that one can distinguish between three types of intervals in the continuum of idiosyncratic technological duration of jobs. Because the lower the job-specific λ the higher the technological duration of the job, some firms have low job-specific values of λ that hire directly on a permanent contract, whereas firms with intermediate values of λ hire on a temporary basis and then convert the job into a permanent status. Finally, some firms with a high value of λ hire on a temporary basis and never convert the contract into an open-ended contract. As spelled out in the appendix, in the equilibrium three types of jobs that a given worker can match with therefore exist: a permanent, open-ended match; a temporary job that is then converted into a permanent job; and a pure temporary job. Where a worker ends up is a matter of luck.

Temporary and open-ended contracts can also coexist in steady state when firms and workers sort into separate submarkets, as proposed by Berton and Garibaldi (2012), in the spirit of directed search models (Wright et al. 2021). The key mechanism is that, conditional on a meeting, the firm prefers a temporary job. Yet an open-ended job vacancy may be filled faster. Thus, a trade-off exists between search costs and values of the match, since a permanent contract from the standpoint of the firm features a lower asset value than a temporary job when the

worker is matched, but it also features a lower expected search cost once the vacancy is posted. The environment is summarized in model F2 in table 2. Suppose further that separate submarkets exist for the two different types of contracts and denote market tightness in these two markets as θ^t and θ^p, respectively. Berton and Garibaldi (2012) show that for the two contracts to coexist in the long run, vacancies in open-ended contracts must be able to be filled at a faster pace than vacancies in fixed-term contracts, that is, $q(\theta^p) > q(\theta^t)$. In other words, more flexibility on the hiring side is traded with less flexibility on the firing side in the submarket for permanent contracts. A sorting of workers also occurs in the two submarkets. The other side of the coin of having a higher rate of vacancy filling in the permanent-contract submarket is that the job-finding rate for workers is higher in the temporary contract submarket, that is, $\theta^t q(\theta^t) > \theta^p q(\theta^p)$. Unless workers are heterogeneous, no worker would enter the temporary submarket.

The appendix reports the details of the equilibrium in Berton and Garibaldi (2012). Their framework can be used to study the effects of training in different submarkets, assuming that, conditional on an adverse λ shock, firms have the option to pay a training cost h to convert the job into high-productivity status. One can show that a range of training opportunities at investment cost h exist such that only the open-ended contracts exercise the option to retrain.

Smith (2007) develops a theoretical model of stock-flow matching with heterogeneous firms. He proposes a directed search equilibrium in the spirit of Moen (1997) in which firms choose not only the wage but also the duration of employment. The search environment is such that firms sample the stock of workers and have the option to return to the labor market to search for the newly arrived into the unemployment pool. Smith (2007)—as indicated in model F3 in table 2—shows a productivity level exists such that higher-productivity firms offer open-ended contracts that are not renegotiated ex post. Conversely, lower-productivity firms offer limited-duration employment with no firing costs due as tenure reaches the date set for the contract. In this perspective, the model shows why different durations coexist endogenously in the market. The obvious empirical implication is that temporary contracts are associated with lower match quality and lower firm profits. Because the wage is set equal to the outside option, no prediction is made in terms of wage differentials.

Empirical evidence on the theoretical mechanisms outlined above is limited. The higher volatility of temporary employment has been found to be associated with the cross-sectional variation in firm-level turnover. In particular, firms experiencing more product demand volatility were found to have a larger share of temporary workers on their payroll (Devicienti, Naticchioni, and Ricci 2018). This buffer stock can either take the form of fixed-term contracts or of temporary work agency employment. Addison et al. (2019), based on administrative data for Germany, show that demand volatility is more associated with the use of a temporary work agency than fixed-term contracts in unionized firms with a work council.

7.3 *Policy Evaluations*

In real-life labor markets, the coexistence of temporary and open-ended contracts is eased by the fact that several countries introduced restrictions to the hiring on temporary contracts in order to contain the expansion of temporary employment documented in section 3. These restrictions range from norms establishing valid cases for the use of fixed-term contracts, to imposing a maximum number of successive fixed-term contract renewals, to a maximum cumulative

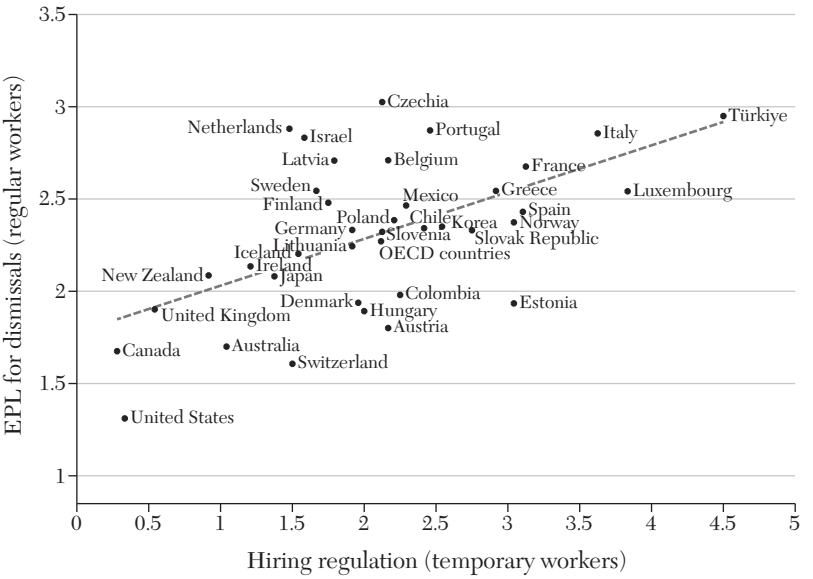

Figure 6. Strictness of EPL for Open-ended Contracts and Restrictions to the Hiring on Temporary Contracts

Notes: The figure displays for each country the EPL (Employment Protection Legislation) index on hiring regulations for temporary workers (*x*-axis) and the EPL index on dismissal regulation for workers on open-ended contracts (*y*-axis). The dotted line is the prediction of a linear regression of the EPL index for temporary workers on the EPL index for workers with open-ended contracts. See OECD Employment Outlook (2020) for details about the two indexes.

Source: OECD (2021a, b).

duration of fixed-term contracts with the same employer.

Figure 6 displays, on the vertical axis, the OECD indicator of the strictness of EPL for workers with permanent contracts and, on the horizontal axis, the EPL indicator for restrictions on the hiring of temporary workers, developed by assembling the information on the various restrictions detailed above. Also in this case, larger numbers denote stricter regulations.

A clear, positive relationship exists between the two measures: countries with strict EPL for workers on open-ended contracts also apply stronger restrictions in the hiring of temporary workers. This finding is an indication of the willingness to prevent "excessive" contractual dualism, that is, the coexistence of workers with open-ended contracts and a large segment of the workforce with fixed-term contracts. Hiring restrictions are indeed particularly strong in Turkey, Italy, France, Greece, and Spain, all countries with strict EPL for open-ended contracts and relevant contractual dualism.

How effective are these restrictions in containing the growth of temporary employment? Güell and Petrongolo (2007) find legal limits to the duration of fixed-term contracts in Spain increase the probability that they are converted into open-ended contracts close to the maximum duration of the contract. These different restrictions need not be equivalent in their effects. For instance,

in some countries with marked contractual dualism, firms frequently recall workers after their contract has expired. In this context, imposing a maximum number of successive fixed-term contracts can be more effective than imposing a maximum cumulated duration of fixed-term contracts.

Red tape costs in the use of temporary contracts may, however, backfire, notably when they are sources of uncertainty for employers' hiring policies. Based on Italian firm-level data, Cappellari, Dell'Aringa, and Leonardi (2012) find uncertainty concerning the interpretation of judges of the conditions under which vacancies of fixed-term contracts may be issued could have discouraged many firms from creating jobs, having negative consequences on various measures of productivity.

One must also be aware of the fact that substitutability between temporary and permanent employment is limited. Cahuc et al. (2022) find a 2009 reform preventing the use of fixed-term contracts by large firms creating new plants in Portugal was successful in reducing the number of fixed-term jobs, but did not increase the number of permanent contracts and decreased employment in large firms.

Countries, such as France and Italy, increased social security contributions for fixed-term contracts relative to open-ended contracts, given the higher risk of unemployment that the first type of jobs involve. Cahuc et al. (2019) find increased tax wedges on temporary jobs may backfire because they reduce the mean duration of jobs and decrease job creation, employment, and welfare of unemployed workers.

An alternative to raising contributions in fixed-term contracts is to fiscally encourage their transformation into open-ended contracts. Kugler, and Jimeno-Serrano, and Hernanz (2003), drawing on the Spanish Labor Force Survey, analyze the effects of a reform in Spain that reduced payroll taxes and dismissal costs for permanent contracts in an attempt to encourage the transformation of temporary into open-ended contracts. They find the reduction of payroll taxes and dismissal costs increased the employment of young men and women on permanent contracts. Also, the 2006 Spanish reform introducing substantial fiscal incentives to the conversion of fixed-term into permanent contracts would seem to have had an impact on the fall of the employment share of fixed-term contracts (Bentolila et al. 2012). Sestito and Viviano (2018) find large effects of the fiscal incentives introduced in Italy in 2015 to encourage the conversion of fixed-term into permanent contracts, although disentangling these effects from those of a reform reducing the costs of dismissals on open-ended contracts is difficult.

Another policy dealing with labor segmentation directly addresses inefficiencies related to employment protection in open-ended contracts. This is the spirit of the graded security contract, replacing the dichotomy between open-ended and temporary contracts. In this contract, employment protection gradually increases with tenure and it mainly takes the form of a transfer from the employer to the worker rather than a payment to a third party (García-Pérez and Osuna 2012; Bentolila et al. 2012; Boeri, Garibaldi, and Moen 2017).[10]

García-Pérez and Osuna (2012) calibrate a search-matching model of the Spanish economy to simulate the potential effects of the introduction of a graded security contract in Spain. Their simulations suggest these contracts would be greatly beneficial for a majority of workers. Boeri, Garibaldi, and Moen (2017) provide simulations of the welfare gains of a severance pay scheme graded

[10] Note that in this context, employment protection has efficiency properties insofar as it represents a commitment device for employers vis-à-vis their workers, encouraging the latter to invest in firm-specific human capital. See Boeri, Garibaldi, and Moen (2017).

on the basis of tenure and relate the optimal level of severance to the efficiency of the legal system. Boeri and Garibaldi (2019) find evidence of a substantial increase in open-ended hiring and in the conversion of fixed-term into open-ended contracts in the aftermath of the Italian Jobs Act that introduced a graded security contract. The Italian graded security contract, unlike those investigated by the literature (García-Pérez and Osuna 2012; Bentolila et al. 2012; Boeri, Garibaldi, and Moen 2017), envisage a marked discontinuity (a 50 percent increase) in the level of severance pay after two years of tenure. Bertoni, Chinetti, and Nisticò (2023) compare labor market outcomes and perceived job insecurity of workers hired before and after the Jobs Act and with tenures below (less than 2 years long) or above (2–3 years) the discontinuity. They find the increase in the layoff probability associated with being hired with the new contract vis-à-vis workers hired before on an open-ended basis disappears after two years, when mandatory severance pay increases. Perceptions of workers about job insecurity, on-the-job search, and overtime work decrease and become aligned with those of the preexisting open-ended contracts above the discontinuity. The reduction of employment security induced by the reform affected only workers in firms with more than 15 employees. Using this discontinuity, De Paola, Nisticò, and Scoppa (2021) find that an unintended consequence of the reform was to reduce fertility rates.

Dolado, Lalé, and Siassi (2021) develop a computable general equilibrium model of dual labor markets and find the welfare gains of reforming a dual EPL system are sizeable and achieved mostly through a decrease in turnover at short job tenures. Conde-Ruiz et al. (2023) investigate the effects of a reform that in 2021 drastically restricted the use of fixed-term contracts while leaving unaltered the rules concerning open-ended contracts. They find fixed-term contracts were substituted by job-on-call and zero-hours arrangements within nominally open-ended contracts. As a result, the average tenure of open-ended contracts halved after the reform relative to the period before. The authors conclude the reform had "minimal" effects on labor market segmentation.

8 *Concluding Remarks*

The spread of temporary employment has generated a wealth of studies across both sides of the Atlantic. While temporary employment in the United States primarily has the characteristics of contingent work, temporarily replacing workers on leave, in Europe it is a sort of secondary labor market developed to give more flexibility to firms in managing their workforce while keeping unchanged employment protection for open-ended contracts. In this article, using mainly the lenses of matching models, we have reviewed and interpreted the results of the empirical literature providing explanations for the spread of temporary contracts on total employment, the business-cycle volatility of temporary employment, asymmetric wage setting in dual labor markets, and the different careers of workers with temporary and open-ended contracts.

Although many facts about temporary employment can be understood by the theoretical perspectives summarized in this paper, many gray areas remain to be addressed by further research. More work is warranted in rationalizing why behavioral responses to temporary employment vary across different institutional contexts. Structural model estimation can be particularly useful in this respect. More work is also warranted in evaluating the human capital investment on the job and hence long-term growth implications of temporary employment. More work is warranted covering the conversion of temporary contracts into open-ended contracts. Empirical research should evaluate the

magnitude of conversion costs and evaluate whether there is any blip in wages at conversion as implied by the DMP model. Theoretical work should carefully consider this prediction of the DMP model and evaluate potential mechanisms, such as changes in the bargaining power of workers, that could attenuate this quite surprising result.

Finally, our survey does not cover alternative employment arrangements. However, as long as some of these new contractual regimes are legally equated to dependent employment contracts with fixed duration—as in a recent draft EU directive—or they are introduced as a substitute to temporary employment—as in the 2021 Spanish labor market reform—the effects of contractual dualism analyzed in this paper are likely to emerge also with the spread of alternative arrangements, including zero-hours contracts, job-on-call arrangements, platform work, and, more broadly, the so-called gig economy.

Appendix: Theoretical Framework

In this appendix, we present models in which temporary contracts coexist with open-ended contracts subject to mandatory firing costs.[11] To properly model contractual dualism, we first need to present a baseline matching model with homogeneous and risk-neutral workers, exogenous job destruction, a firing tax for open-ended contracts, and a single submarket.

Baseline Homogeneous Model with Firing Tax

The baseline model is one in which all jobs are open ended and a firing tax F^p must be paid outside the match when the job is destroyed. Time is discrete, and the discount rate is denoted by δ. All value functions represent the stationary values. Firms and workers meet in the unique market. If we denote by J^{pe} the value of a filled job to a firm, the value of a vacancy V reads

$$V = -c + \delta q(\theta^p) J^{pe} + \delta\left[1 - q(\theta^p)\right] V, \tag{1}$$

where c is the search cost paid by the firm, θ^p is market tightness (the vacancy to unemployment ratio) for permanent jobs, and $q(\theta^p)$ denotes the probability of job filling from the firm's standpoint. Similarly, if we define with W^{pe} the value of a job to a worker, the value of unemployment U reads

$$U = z + \delta\theta^p q(\theta^p) W^{pe} + \delta\left[1 - \theta^p q(\theta^p)\right] U, \tag{2}$$

where z is the flow value of unemployment and $\theta^p q(\theta^p)$ is the job-finding probability for the worker. At the time of the first meeting, the firm and the worker need to decide whether to form a permanent job and no firing tax is due if they separate without forming a match. Conversely, if they form the match, the firing tax will be due in case of separation. Once the firm and the worker are paired together, the joint value of the permanent match M^p is the sum of the value of the job to the firm and the worker, so that $M^p = J^{pe} + W^{pe}$ and its present discounted expression solves

$$M^p = y + \delta\left[\lambda\left(U + V - F^p\right) + (1 - \lambda) M^p\right],$$

where λ is the probability of destruction. The joint value of the job excludes the wage, because it is a pure transfer between the firm and the worker. The joint value can be simply written as

$$M^p = \frac{y + \delta\lambda(U + V) - \delta\lambda F^p}{1 - \delta(1 - \lambda)}. \tag{3}$$

[11] For details of the pure temporary model, we refer to Garibaldi and Gomes (2022).

Wage formation distinguishes between the surplus sharing in the first period of a permanent job and the wage formation from the second period onward. With the exception of the first period of job/contact, the surplus of an open-ended job is the sum of the joint values of workers and firms net of the outside option of the parties. The latter includes the firing tax and reads $S^p = M^p - (U + V - F^p)$. In other words, bargaining from the second period onward also involves the firing tax F^p. This finding implies that the discounted value of the surplus is

$$(4) \quad S^p = \frac{y - (1-\delta)U + (1-\delta)F^p}{1 - \delta(1-\lambda)}.$$

The surplus is shared in the standard way, and the worker gets a fraction β of the total surplus. While the analytical details of surplus sharing and Nash bargaining for wage determination are discussed below, in this basic model, note that in the first period the firing tax is not due and the outside option of the firm does not involve the firing tax. The surplus at entry for a permanent job is denoted by S^{pe} and reads $S^{pe} = M^p - (U + V)$. The discounted value of the surplus at entry is therefore

$$S^{pe} = \frac{y - (1-\delta)U - \delta\lambda F^p}{1 - \delta(1-\lambda)}.$$

Since $J^{pe} - V = (1-\beta)S^{pe}$, one can easily write from equation (1)

$$(5) \quad V(1-\delta) = -c + \delta q(\theta^p)(1-\beta)S^{pe}.$$

Similarly, since $W^{pe} - U = \beta S^{pe}$ one can easily write from equation (2)

$$(6) \quad U(1-\delta) = z + \delta\theta^p q(\theta^p)\beta S^{pe}.$$

Note that in both equations for V and U, the relevant surplus is S^{pe}. The model is closed with the standard free entry condition that implies $V = 0$ and determines the value of market tightness

$$(7) \quad \frac{c}{\delta q(\theta^p)} = (1-\beta)S^{pe}.$$

The labor market is viable as long as the equilibrium surplus at entry is positive, that is, $S^{pe} = \frac{y - (1-\delta)U - \delta\lambda F^p}{1 - \delta(1-\lambda)} > 0$. Note that for a given value of U, the existence of the firing tax implies that a labor market that is privately efficient (where $y > (1-\delta)U$) may not be viable because the firing tax turns the surplus at entry to be negative (i.e., $S^{pe} < 0$). This further implies that a reduction of the firing tax—e.g., related to the introduction of temporary jobs—makes the labor market more (privately) efficient in this setup. The key endogenous variable in the model is market tightness θ^p and its value is determined by the following (job creation) condition

$$(8) \quad \frac{c\left[1 - \delta(1-\lambda)\right]}{q(\theta^p)\delta} + \beta c\theta^p = (1-\beta)(y - z - \lambda\delta F^p).$$

Using the surplus sharing condition at entry, the value of unemployment is linear in market tightness and reads $U(1-\delta) = z + c\frac{\beta\theta^p}{1-\beta}$. Simple comparative statics show $\frac{\partial\theta^p}{\partial F^p} < 0$, so that the firing tax reduces the vacancy-to-unemployment ratio. The expression for the wage of permanent workers is derived below and yields

$$w_{pe} = \beta y + (1-\beta)(1-\delta)U - \beta\delta F^p;$$

entry wage—first period

$$w_p = \beta y + (1-\beta)(1-\delta)U + \beta(1-\delta)F^p;$$

continuation wage.

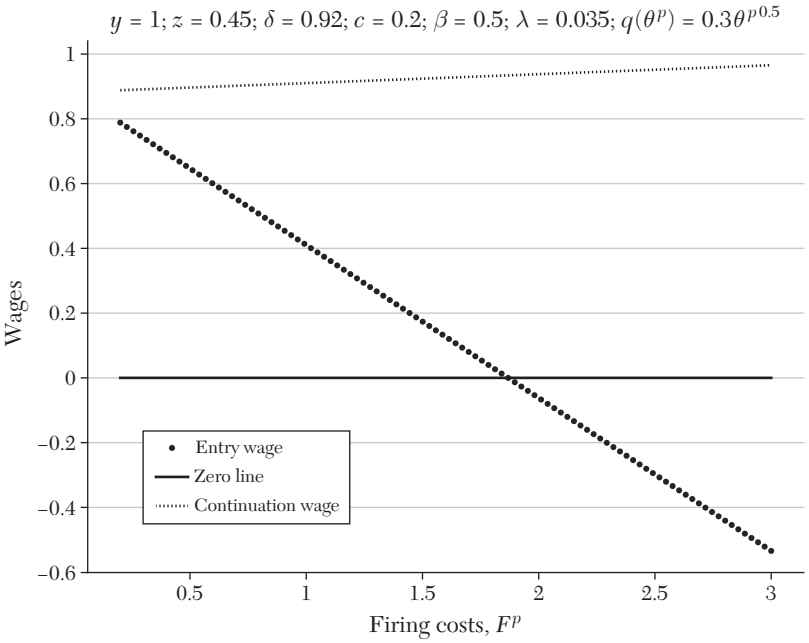

Figure A1. Simulations of Entry and Continuation Wage for Different Levels of the Firing Tax

Notes: The figure displays the entry and continuation wage for the basic model with firing tax. The parameters are standard in the literature and coherent with Petrongolo and Pissarides (2001) and Shimer (2005). All parameters are expressed in productivity units. The range of the firing tax is $F^p \in [0.2, 3]$. The entry wage is $w_{pe} = \beta y + (1-\beta)(1-\delta)U - \beta\delta F^p$ and the continuation wage is $w_p = \beta y + (1-\beta)(1-\delta)U + \beta(1-\delta)$. The labor market is viable for all values of the firing tax and equilibrium market tightness $\theta^p \in [2.05, 1.70]$.

While the worker partly prepays the firing tax at entry, the value of the entry wage can be positive or negative depending on the specific parameters. Figure A1 simulates the entry and continuation wages for different levels of the firing tax using basic parameters from the literature, and in particular from Petrongolo and Pissarides (2001) and Shimer (2005). The figure shows that with sufficiently high levels of the firing tax relative to the productivity of the job (taken as numeraire), the entry wage turns negative even though the labor market is viable. As total employment is $n = \frac{\theta^p q(\theta^p)}{\theta^p q(\theta^p) + \lambda}$, the model implies that a higher firing tax also reduces total employment.

The Introduction of Temporary Contracts: The Honeymoon Effect

Suppose now that temporary contracts are introduced and they can be terminated at no cost with a probability ρ per period. When the temporary job ends, firms have the option to convert it into an open-ended job (model B1 in table 2). From that moment onward, firing taxes are due in case of separation. Thus, the joint value of a temporary match reads

$$(9) \quad M^t = \frac{y + \delta\lambda U + \delta(1-\lambda)\rho\max\{M^p - \xi, U + V\}}{1 - \delta[1 - \lambda(1-\rho)]},$$

where the key property of the temporary job is that firing costs are not due during the lifetime of the job and that, at the end of the contract, firms have the option to convert the job into a permanent position. ξ is the cost of converting a temporary job into a permanent position. Note that at the time of conversion, the firing tax is still not due and the outside option is $U + V$. The surplus from a temporary job is defined as $S^t = M^t - V^t - U$ and reads

$$(10) \quad S^t = \frac{y - (1-\delta)U + \delta(1-\lambda)\rho\max\{S^{pe} - \xi, 0\}}{1 - \delta(1-\lambda)(1-\rho)}.$$

Suppose now that permanent jobs are viable (i.e., $S^{pe} > \xi$) and converting the job at the expected duration is optimal (i.e., when ρ strikes in the model). Formally, this condition requires that $y - (1-\delta)U > \delta\lambda F^p + \xi$. In this case, any vacancy is posted as a temporary job and job creation reads

$$(11) \qquad \frac{c}{\delta q(\theta^t)} = (1-\beta)S^t.$$

This condition in turn implies that firms increase job creation and $\theta^t > \theta^p$. At the steady state, all hires are on a temporary basis and total employment will be

$$(12) \qquad n^t = \frac{\theta^t q(\theta^t)}{\theta^t q(\theta^t) + \lambda}.$$

Thus, a labor market with only temporary jobs will experience more employment. In the short run, letting τ index time, temporary jobs are introduced with a stock of open-ended jobs:

$$(13) \qquad n^{tot}_{\tau+1} = \theta^t q(\theta^t)\left(1 - n^{tot}_{\tau}\right) - \lambda n^{tot}_{\tau} - \lambda n^{t}_{\tau},$$

where $n^{tot}_{\tau} = n^{p}_{\tau} + n^{t}_{\tau}$, is the sum of temporary and permanent employment. At the time of the introduction of temporary contracts, the stock of existing jobs is destroyed at rate λ, whereas the new jobs are created by the higher market tightness θ^t. Thus, employment immediately increases. The latter effect is the so-called honeymoon effect associated with the introduction of temporary contracts.

The Introduction of Temporary Contracts: Dualism and Market Segmentation

The alternative case is when the conversion clause in the right-hand side of equation (9) is not satisfied (model B3 in table 2). More formally, let us assume that $S^{pe} - \xi < 0$ so that temporary jobs are not converted into open-ended positions and assume that $y - (1-\delta)U < \delta\lambda F^p + \xi$. The key surplus asset equation for temporary jobs becomes

$$(14) \qquad S^t = \frac{y - (1-\delta)U}{1 - \delta(1-\lambda)}.$$

Temporary jobs involve a larger job destruction than permanent contracts since total destruction of temporary jobs is $(\lambda + \rho) > \lambda$. In this economy with

$$y - (1-\delta)U > 0 > \frac{y(1-\delta)U - \lambda\delta F^p}{1 - \delta(1-\lambda)} - \xi,$$

the lack of conversion into permanent positions (when ρ strikes) implies that a privately efficient temporary job is destroyed because of the regulation imposed by open-ended jobs. Suppose now that before the introduction of the temporary contract the economy was viable with only permanent jobs and that $\frac{y - (1-\delta)U - \lambda\delta F^p}{1 - \delta(1-\lambda)} > 0$. We shall call the economy with only permanent contracts the "rigid" economy and indicate with $\hat{\theta}^p$ its market tightness. Conversely, we shall indicate

with θ^t market tightness of the "flexible" economy with only temporary contracts. Simple algebra shows that market tightness in the "rigid" and the "flexible" economy solve

$$\frac{c}{\delta\beta q\left(\hat{\theta}^p\right)} = \frac{y-(1-\delta)U-\delta\lambda F^p}{1-\delta(1-\lambda)}, \tag{15}$$

$$\frac{c}{\delta\beta q\left(\theta^t\right)} = \frac{y-(1-\delta)U}{1-\delta(1-\lambda)(1-\rho)},$$

and one can show that $\theta^t > \hat{\theta}^p$. This result implies that if temporary contracts are introduced in a "rigid" labor market, only temporary contracts would be created and the economy would experience larger flows from employment to unemployment (since $|\lambda+\rho| > |\lambda|$) and larger flows into employment (since $\theta^t > \hat{\theta}^p$). At the steady state all hires will be with temporary contracts and total employment will be

$$n^t = \frac{\theta^t q\left(\theta^t\right)}{\theta^t q\left(\theta^t\right)+\lambda+\rho}. \tag{16}$$

While the "flexible" economy is more efficient, total employment is not necessarily higher than in the "rigid" economy, a result that is standard in the EPL literature. In the short-run transition from a "rigid" to a "flexible" economy, letting τ index time, temporary jobs are introduced with a stock of open-ended jobs

$$n_{\tau+1}^{tot} = \theta^t q\left(\theta^t\right)\left(1-n_\tau^{tot}\right) - \lambda n_\tau^{tot} - (\lambda+\rho)n_\tau^t \tag{17}$$

where $n_\tau^{tot} = n_\tau^p + n_\tau^t$. At the time of the introduction of temporary contracts, the stock of existing permanent jobs is destroyed at rate λ while the new jobs are created by the higher market tightness θ^t. The effect on total employment is ambiguous, but in the very short run ($n_\tau^t \approx 0$) there is a honeymoon effect.

Wages

In the setting of dual labor markets, wages are obtained by Nash bargaining (model B3 in table 2). Assume for simplicity that firing costs are zero when the job is temporary, whereas $F^p > 0$ and the cost of converting the contract is negligible (i.e., $\xi \approx 0$). We can show that if workers start on temporary jobs and jobs are then converted into permanent contracts, the wages in the two situations are

$$w_t = \beta y + (1-\beta)(1-\delta)U; \quad \text{temporary phase} \tag{18}$$

$$w^p = \begin{cases} \beta y + (1-\beta)(1-\delta)U - \lambda\beta F^p; & \text{period of conversion} \\ \beta y + (1-\beta)(1-\delta)U + \beta(1-\delta)F^p; & \text{continuation wage} \end{cases} \tag{19}$$

The issue about Nash bargaining and how firing costs should enter the negotiation has been addressed by Mortensen and Pissarides (1999) in the context of inside-outside jobs and by Garibaldi and Violante (2005) and Boeri (2011) in the context of temporary and permanent jobs. Mortensen and Pissarides (1999) argue that upon entry, as the job is being formed, firing taxes are not due in case of separation and the Nash bargaining position involves an outside and inside wage even for workers in permanent positions. In our model, consider workers on temporary contracts to be outside workers. The wage for a temporary job solves

$$w_t = \arg\max\left(J^t - V\right)^{1-\beta}\left(W^t - U\right)^{\beta}, \tag{20}$$

TABLE A1
MODEL WITH TEMPORARY CONTRACTS CONVERTED

Symbol	Notation	Value
Panel A. Wages and income		
Unemployed income	$(1-\delta)U$	0.869
Wage in temporary contract	w_t	0.935
Wage in permanent contract: period of conversion	w^p	0.567
Wage in permanent contract: continuation period	w^p	0.967
Panel B. Worker surplus and present values		
Surplus in temporary contract	βS^t	0.501
Surplus in permanent contract: period of conversion	βS^{pe}	0.467
Surplus in permanent contract: continuation period	βS^p	0.867
Panel C. Stocks		
Unemployment rate	u	0.075
Temporary share	$\frac{n_t}{1-u}$	0.104
Market tightness	θ^p	2.097

Source: Authors' calculation $y = 1; z = 0.45; \delta = 0.92; c = 0.2; \beta = 0.5; \rho = 0.3; F^p = 0.8; \lambda = 0.035; q(\theta^p) = 0.3\theta^{p0.5}$.

where J^t is the value of the job to the firm and W^t is the value of the job to the worker. A simple solution of this problem yields the traditional Nash sharing rule:

$$(1-\beta)(W^t - U) = \beta(J^t - V), \tag{21}$$

where the match surplus is $S^t = M^t - U$, and M^t is given by equation (9). Conversely, once the worker is in a permanent job, her wage solves

$$w^p = \begin{cases} \arg\max (J^p - V)^{1-\beta}(W^p - U)^{\beta}; \\ \qquad \text{period of conversion} \\ \arg\max \left[J^p - (V - F^p)\right]^{1-\beta}(W^p - U)^{\beta}; \\ \qquad \text{continuation wage} \end{cases}.$$

and the solution to this problem yields the Nash sharing rule:

$$(1-\beta)(W^p - U) = \beta(J^p - V)$$

period of conversion

$$(1-\beta)(W^p - U) = \beta\left[J^p - (V - F^p)\right]$$

continuation wage.

The surplus in this model is $S^p = \frac{y - (1-\delta)U + (1-\delta)F^p}{1 - \delta(1-\lambda)}$ for the continuation period of a permanent job, and $S^{pe} = \frac{y - (1-\delta)U - \delta\lambda F^p}{r + \lambda}$ as above for the conversion period. The surplus at the temporary phase is

$S^t = \frac{y - (1-\delta)U + \delta(1-\lambda)\rho S^{pe}}{1 - \delta(1-\lambda)(1-\rho)}$. Simple algebra yields the following wage equations:

$$w_t = \beta y + (1-\beta)(1-\delta)U;$$

temporary phase

$$w^p = \begin{cases} \beta y + (1-\beta)(1-\delta)U - \lambda\beta F^p; \\ \quad \text{period of conversion} \\ \beta y + (1-\beta)(1-\delta)U + \beta(1-\delta)F^p; \\ \quad \text{continuation wage} \end{cases}.$$

Note that the change in the threat point in the bargaining position implies $w_p > w_t$ for the continuation wage. The only exception is the period of conversion, where the theory predicts a one-period fall in the wage. The economics behind this temporary blip is that employment protection is not yet operating at that stage, and the worker pays in advance part of this security that she/he acquires moving to a permanent job. It is a sort of Lazear-type bonding scheme (Lazear 1990), although here we deal with firing taxes rather than pure transfers (or severance), and hence only part of the employment protection is paid in advance by the worker in terms of a lower wage.

Table A1 simulates numerically the wage and surplus at different periods of the employment relationship. The table clearly shows that during the period of conversion, there is a one-period fall in the wage that is thereafter compensated by the larger wage when the worker is on a permanent contract and the job has moved beyond the conversion period. The table highlights an additional prediction of the model that has not received enough attention in the literature: the net surplus at the time of conversion of the job from temporary to permanent falls and the worker suffers a one-period utility loss. This effect is due to the fact that the employment match anticipates the presence of the firing tax. As we argued in the text, while there is evidence of two-tier wage structures, this temporary effect has received very little attention. One way to deal with it is to consider that the relative bargaining positions change moving from the temporary to the conversion phase, that is, allow for β to be lower when the worker is on a temporary contract.

Cyclical Fluctuations and Adjustment through Temporary Jobs

Temporary jobs act as a buffer stock for permanent jobs. Assume jobs are opened as temporary jobs and the productivity y^k fluctuates from y^g to y^b with probability μ, where b refers to bad business conditions and g to good business conditions (models C1 in table 2). Thus, both temporary jobs and all asset functions are indexed also by the aggregate condition $k \in \{g,b\}$. In particular, we let S_k^t be the value of temporary jobs in aggregate conditions k. The specification of the equilibrium mentioned in the text is one in which temporary jobs are converted into open-ended jobs in good times, whereas they are destroyed at maturity in bad business conditions. The value functions for the temporary surplus read in this case

$$(24) \quad S_g^t = \frac{y^g + \delta\begin{bmatrix}\lambda U + (1-\lambda)\mu S_b^t \\ + (1-\lambda)(1-\mu)\rho\left(S_g^{pe} - \xi\right)\end{bmatrix}}{1 - \delta(1-\lambda)(1-\mu)(1-\rho)}$$

$$S_b^t = \frac{y^b + \delta\left[\lambda U + (1-\lambda)\mu S_g^t\right]}{1 - \delta(1-\lambda)(1-\mu)(1-\rho)},$$

where it is clear that $S_g^{pe} - \xi > 0 > S_b^{pe} - \xi$. In this case, all temporary jobs are not converted in bad times when μ strikes, and the increase in unemployment

is driven by the fall of temporary jobs. The surplus in open-ended jobs is defined as

$$S_k^{pe} = \frac{y^k - (1-\delta)U_k - \delta\lambda F^p + \mu S_i^{pe}}{1-\delta(1-\lambda)(1-\mu)}$$

$$k,i \in \{g,b\}.$$

Job creation is simply defined as

$$\frac{c}{\delta q(\theta^k)} = (1-\beta)S_k^t;\ k \in \{g,b\} \tag{25}$$

$$\theta^g > \theta^b.$$

The dynamics of unemployment in this case is

$$u_{\tau+1} = \lambda(n_\tau^t + n_\tau^p) + \rho\phi_\tau n_\tau^t - \left[\phi_\tau\theta^b q(\theta^b) + (1-\phi_\tau)\theta^g q(\theta^g)\right]u_\tau. \tag{26}$$

Hence, in recessions (when $\phi_\tau = 1$) excess job destruction occurs driven entirely by temporary contracts that are not converted.

Heterogeneous Jobs

The simple model outlined above on the introduction of temporary contracts has a key prediction, namely that eventually all new hires will be on a temporary job and total employment is absorbed by temporary positions. This scenario does not occur in reality. Thus, some models show the coexistence of temporary and permanent contracts in a cross-section of jobs. Model F1 in table 2 studies how temporary and permanent jobs coexist in a cross-section of heterogeneous jobs. The productivity y is constant across jobs and, conditional on a λ shock, the productivity of the firm drops to zero. Firms are heterogeneous with respect to this arrival rate and they draw λ from a continuous distribution $\Omega(\lambda)$ with support $\lambda \in [0,\infty]$. Workers are homogeneous and enjoy outside option U. The legislation allows only for two types of contracts. A λ job can be made permanent (or open-ended) or temporary. If the λ job is permanent, $M^p(\lambda)$ has open-ended duration and can be destroyed only at a cost F^p. Alternatively, a λ job can be regulated as a temporary job. In this case, the job has a stochastic duration of $1/\rho$. When ρ strikes, firms have the option of converting the job into an open-ended contract. Note that firms have to pay the wage bill when the shock λ strikes, but the ρ shock has not yet hit the firm. For simplicity, the model can be solved with a fixed wage $\bar{w}$ across jobs. Converting a temporary contract into a permanent job costs ξ.

The main result is that the decision on the different contracts is governed by three reservation productivity levels λ^{*p}, λ^{*c}, and λ^{max}, such that for $\lambda < \lambda^{*p}$ firms open up open-ended jobs. For values of $\lambda \in [\lambda^{*p}, \lambda^{*c}]$ firms open up temporary jobs and convert them into open-ended contracts when ρ strikes. Since converting a job from permanent to temporary involves a cost ξ, for sufficiently low values of λ the firm prefers opening a permanent job. For $\lambda \in [\lambda^{*c}, \lambda^{max}]$, firms open up temporary jobs that are not converted. Finally, for values of $\lambda > \lambda^{max}$ the job is not opened. The joint value of an open-ended contract is

$$M^p(\lambda) = \frac{y + \delta\lambda U - \delta\lambda F^p}{1-\delta(1-\lambda)} \tag{27}$$

whereas the value of a temporary job is

$$M^t(\lambda) = \frac{\begin{pmatrix} y + \delta\lambda U + \delta(1-\lambda) \\ \times\ \rho\max\{M^p(\lambda) - \xi,\ U+V\}\end{pmatrix}}{1-\delta[1-\lambda(1-\rho)]}, \tag{28}$$

where $F^t < F^p$ is the expected cost that a firm has to face in case a temporary job is destroyed. We can easily identify $M^{t,c}$ as the joint value of the temporary job when it is converted, and $M^{t,nc}$ as the same joint value when it is not converted. Introducing the

surplus from the two jobs, the reservation productivity satisfies

$$(29)\quad \frac{c}{\delta(1-\beta)q(\theta)} = \int_0^{\lambda^{*p}} S^p(z)dF(z) + \int_{\lambda^{*p}}^{\lambda^{*c}} S^{t,c}(z)dF(z) + \int_{\lambda^{*c}}^{\lambda^{\max}} S^{t,nc}(z)dF(z),$$

where S^p is the surplus from the permanent job, $S^{t,c}$ is the surplus from a temporary job that is converted and $S^{t,nc}$ is the surplus from a temporary job that is not converted.

Temporary Jobs with Employment Protection and Heterogeneous Workers

Sorting in Submarkets

Temporary and open-ended contracts can also coexist when firms and workers sort into separate submarkets, as proposed by model F2 in table 2. Conditional on a meeting, the firm prefers a temporary job. Yet, an open-ended job may be filled faster. Thus, a typical trade-off exists between ex ante search costs and ex post value of the match of directed search models. Consider the joint value of open-ended and temporary jobs as

$$(30)\quad M^p = \frac{y + \lambda\delta U_i - \lambda\delta F^p}{1-\delta(1-\lambda)}$$

$$M^t = \frac{y + \lambda\delta U_i}{1-\delta(1-\lambda)},$$

where we do not allow for the option to convert the temporary job. For simplicity, the model is solved for a fixed wage $\bar{w}$. For a given outside option of the worker U_i, clearly $M^t > M^p$. In words, the asset value for a firm of a job with a fixed-term contract is higher than the value of a job with an open-ended contract. Suppose further that separate submarkets exist for the two different types of contracts, and denote market tightness in these two markets as θ^t and θ^p, respectively. The value of a fixed-term vacancy reads

$$(31)\ (1-\delta)V^t = -c + \delta q(\theta^t)(1-\beta)E[S^t],$$

whereas the value of a vacancy for a permanent contract is

$$(32)\ (1-\delta)V^p = -c + \delta q(\theta^p)(1-\beta)E[S^p],$$

where $E[S^t]$, and $E[S^p]$ are the expected surplus of a temporary job and the expected surplus of permanent jobs. The key intuition is that competition at entry drives down the two values to zero, namely,

$$(33)\quad \frac{c}{\delta q(\theta^t)} = E[S^t];\ \frac{c}{\delta q(\theta^p)} = E[S^p].$$

For a given outside option of the unemployed and with a fixed wage, clearly ex post $E[S^t] > E[S^p]$. Thus, for the two contracts to coexist in the long run, vacancies in open-ended contracts must be able to be filled at a faster pace than vacancies in fixed-term contracts, that is, $q(\theta^p) > q(\theta^t)$. In other words, more flexibility on the hiring side is traded with less flexibility on the firing side in the submarket for permanent contracts.

Let us look then at the sorting of workers in the two submarkets. The other side of the coin of having a higher rate of vacancy filling in the permanent-contract submarket is that the job-finding rate is higher in the temporary contract submarket, that is, $\theta^t q(\theta^t) > \theta^p q(\theta^p)$. Unless workers are heterogeneous, no worker would enter into the temporary submarket. Model F2 in table 2 considers that workers differ by some value of leisure parameter z, which is a draw from some distribution $F(\cdot)$. In other words, the

value of unemployment in the two submarkets will be given by

$$(34)\quad (1-\delta)U_i^p(z) = z + b + \delta\theta^p q(\theta^p)\left[(1-\beta)S^p(z)\right],$$

where b can be interpreted as a sort of unemployment benefit (granted only to workers with long tenures such as those in the permanent-contract submarket), and

$$(35)\quad (1-\delta)U_i^t(z) = z + \delta\theta^t q(\theta^t)\left[(1-\beta)S^t(z)\right].$$

Both value functions are increasing in z, but the value function referred to as the fixed-term submarket is steeper in z. At the same time, the value function for permanent contracts has a higher intercept. Thus, if the two value functions cross each other at some threshold z^R, this threshold—defined as $U_R^t(z^R) = U_R^p(z^R)$—exists and is unique. The key result is that temporary and permanent submarkets coexist as long as R exists. Further, if R exists, it is lower than the wage, so that $R < w$.

Training in Different Submarkets

The framework of model F2 in table 2 can be used to study the effects of training in different submarkets. We assume that, conditional on an adverse λ shock, firms have the option to pay a training cost h to convert the job into high-productivity status:

$$(36)\quad M^p = \frac{y + \delta\lambda\max\{M^p - h, U_i - F^p\}}{1-\delta(1-\lambda)}$$

$$(37)\quad M^t = \frac{y + \delta\lambda\max\{M^t - h, U_i\}}{1-\delta(1-\lambda)}.$$

One can show a range of training opportunities h

$$h \in \left[U^p(z^j),\ U^p(z^k) - F^p\right]$$

exist such that the option to retrain is exerted only by the open-ended contracts.

Temporary Jobs as Port of Entry or Dead End

One of the main issues in the literature is whether temporary contracts act in the labor market as a port of entry intro open-ended employment or as a dead end (terminology used in the model type D1 in table 2). Suppose worker heterogeneity exists in terms of productivity, so that the population has both more and less productive workers. Suppose also that the firms observe worker quality only after the meeting takes place. In other words, the productivity of the worker is an inspection good that can be assessed only upon meeting. We thus assume the presence of s^h skilled high-productivity workers and $1 - s^h$ low-productivity workers. Suppose vacancies are posted in the market as temporary jobs with an option of being converted. High-productivity workers have a flow productivity $y^h > y^l$. Assume for simplicity that wages are fixed and exogenous. When worker heterogeneity exists, the joint match value of temporary workers reads

$$(38)\quad M_i^t = \frac{\begin{pmatrix} y^i + \delta\lambda(U_i + V^t) \\ + \delta\rho\max\{M_i^p - \xi, U_i + V\}\end{pmatrix}}{1-\delta(1-\lambda)(1-\rho)} \quad i \in h,l$$

An obvious equilibrium configuration is that temporary jobs are converted into permanent jobs only for high-productivity workers. Formally, this equilibrium configuration happens if $M_h^p > 0 > M_l^p$ or

$$(39)\quad \frac{y^h + \delta\lambda U_h - \delta\lambda F^p}{1-\delta(1-\lambda)} > 0 > \frac{y^l + \delta\lambda U_l - \delta\lambda F^p}{1-\delta(1-\lambda)}.$$

If this condition holds, temporary jobs are a dead end. This model is particularly relevant for young workers, whose entrance in the labor market is typically driven by temporary contracts. This equilibrium configuration implies that a fraction of the labor force has only access to temporary contracts, whereas other workers move into open-ended and stable jobs.

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