National Context and Atypical Employment

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This paper takes a macro approach, examining country level determinants of three types of atypical employment (fixed term, part-time, and self employment) in 30 developed countries. Support is found for three hypotheses: atypical work arrangements are more prevalent i) when there is a strong entrepreneurial culture, ii) when there are legal constraints on firms, and iii) when economic constraints force workers to accept atypical employment. The paper also qualitatively examines countries' legislative and judicial histories with respect to atypical work, and future policy directions are suggested.

keywords: atypical employment, part-time, part time, self employment, fixed term, fixed-term

1 Introduction

"Atypical" employment is any type of employment that is not full-time and permanent with a single direct employer. It includes many diverse forms of work including part-time, self employment, fixed term contracts, temp work, free-lancing, piecework, unpaid family labor, and informal day labor. The label "atypical" lumps together arrangements that workers and employers choose for various reasons and with distinct consequences. This paper tests three hypotheses about how macro-context influences the total level of three types of atypical employment: fixed term, part-time, and self employment. Fixed term employment is similar to regular full-time work, with the exception that it has a specified end-date at the time of hire. In the United States, which has "employment at will," this is not theoretically different from regular employment, which can be terminated by both the employer and the employee at any time. Definitions of part-time work vary by country with thresholds normally between 30 and 35 hours a week. Workers working less than 10 hours per week are often considered "casual" workers rather than part-time. In the US part-time is employer-defined so that a worker working 38 hours a week in the US could be part-time, but in France the same worker is working overtime.

"Self employment" usually includes two distinct types of atypical employees: entrepreneurs and "dependent self employed" workers (free-lance or independent contractors who for all intents and purposes are employees although their contract is not an employment contract but a contract for services). In many studies the two groups are indistinguishable. Studies attempting to parse out the two groups have various estimates of how many workers are dependent self employed. In the UK, approximately 9% of the self employed (or 1.3% of the entire labor force) have no employees and only one purchaser

of their services, likely dependent self employed workers. These workers are predominantly in construction, financial services, or skilled trades, are men, have less education than employees, and are likely to remain in positions as contractors (Böheim and Muehlberger, 2006). In Italy, estimates of the dependent self employed range from .88 to 5.3% of the labor force (Muehlberger and Pasqua, 2006; Alteri and Oteri, 2004), depending on the definition used. The dependent self employed in Italy differ from the average worker in that they are younger, more often single, more educated (in contrast to in other countries), in the service sector, and more often in Northern Italy. It is estimated that as many as 30% of Italian firms use these workers (Aris et al., 2001) and that most of these workers would prefer regular employment (Muehlberger and Pasqua, 2006). Their chances of transitioning to a standard job are higher the more they earn (Berton et al., 2005) and they are actually more likely to transition to unemployment than regular workers (Muehlberger and Pasqua, 2006). In Austria, the dependent self employed make up approximately 1.6% of the workforce (Heineck et al., 2004) and only 1% of the Greek workforce (EIRO, 2005). While the distinction between the two types of self employed workers is very important, this study is unable to distinguish between them. In surveys, workers generally self-report their status. Some dependent self employed (who generally commute to the same firm every day) misreport themselves to be employees (Bjelland et al., 2006). Part-time and fixed term workers are better able to correctly self-identify their status.

This paper proposes three main hypotheses regarding the macro level contexts influencing the level of atypical employment. The first hypothesis is that firms might employ more atypical workers when permanent employment contracts are strictly regulated, the "free-market seeking hypothesis." The

second hypothesis is that in a weak labor market, firms have more bargaining power and can successfully offer workers atypical jobs (which generally have lower salaries, benefits, and protections). Theoretically, a firm might also hire permanent workers at lower wages during downturns, although qualitative research suggests that there is less resentment when workers with different contracts receive different treatment (both better and worse) than when workers with the same contract receive different treatment. As such, it seems reasonable that when the market will bear lower wages, firms hire these new, lower paid, workers under atypical contracts. We call this the "constrained individual choices" hypothesis because this is when workers are forced to accept atypical employment, against their preferences, in a weak labor market. The third hypothesis, "entrepreneurial spirit," posits that workers prefer atypical employment when they have entrepreneurial goals. This is not only an individual-level cause, but it is also a macro-level hypothesis insofar as entrepreneurial motivation is time-culture specific. The entrepreneurial hypothesis is normally discussed in the context of self employment, although individuals starting their own businesses are likely to prefer to work in other forms of atypical employment as well. Finally, it is already a well-established fact that the proportion of women in the labor force strongly influences the overall level of part-time employment, and possibly other types of atypical employment, because women prefer flexible employment while raising children.[1] In addition, there are other disincentives for firms to use atypical workers, such as the fact that permanent regular workers are thought to be more productive and have more firm-specific knowledge- which are not applicable to a country-level analysis as they operate more at a firm and

[1] See Bardasi and Gornick (2000); Blossfeld and Hakim (1997); Kauhanen (2008); Gregory and Connolly (2008); Connolly and Gregory (2007); Paull (2008) for discussions of women in part time work. For self employment and women see Strohmeyer and Tonoyan (2007).For fixed term work and women see Gash and McGinnity (2007); Petrongolo (2004)

occupation level.

These three hypotheses are not mutually exclusive and can simultaneously influence atypical employment levels. For example, self employment might normally be driven by entrepreneurial spirit, but individuals might also chose self employment as a last resort in economies with high unemployment (constrained individual choices) or firms seeking to avoid regulations might use more independent contractors (free-market seeking hypothesis). Similarly, firms might seek flexibility from legal constraints by using less tightly regulated part-time workers (free-market seeking hypothesis) but part-time work can also be a form of underemployment (constrained individual choices) and entrepreneurial spirit might also influence part-time work, as it enables individuals to start their own businesses in their free time. The primary motivation for fixed term employment is likely that firms seek flexibility by avoiding regulations (free-market seeking hypothesis), although again, workers preferring full-time work might be forced into these positions in a weak economy or workers with entrepreneurial aspirations (e.g. artists) might prefer fixed term assignments, working on their own projects between assignments.

This paper proceeds with a review of the literature on the causes of atypical employment, a description of current trends in atypical employment, followed by research design, findings, a discussion of policy trends related to atypical employment, and finally a conclusion discussing both the quantitative findings as well as policy implications.

2 Literature

The most commonly cited explanation for atypical employment is the free-market seeking hypothesis. Several authors suggest that countries' employment protection legislation (EPL), or the laws governing worker severance,

influences the incidence of fixed term and temporary work (OECD, 2003a; Kalleberg, 2000; Kahn, 2007). Often, using atypical workers allows firms to increase external flexibility and to extend screening periods in an environment where it is difficult to sever employment relationships (Kalleberg, 2000).[2] Strict regulations can also encourage firms to shift towards internal flexibility (as has been shown in Germany (Keller and Seifert, 2005)), which would not affect atypical employment. Even in liberal labor markets like the United States, it has been shown that firms use atypical work to avoid legal constraints. For example, US federal tax code encourages firms to provide health insurance to all their employees by offering a tax deduction for firms offering a certain share of their workers benefits. This encourages firms to buy services rather than hire employees for those positions for which they do not want to provide health insurance for, thus qualifying the firm for the tax deduction while still saving on non-wage compensation. Similarly, the post-1970 increase in part-time work in America may be partially attributed to increases in full-time benefit costs following the Federal and Family Leave Act of 1993 (Kalleberg, 2000).

The constrained individual hypothesis is highly contested for all types of atypical employment except self employment. Some studies find that in a weak economy workers are forced into part-time, fixed term, and self employment (Grip et al., 1997; Blau, 1987) while others find that part-time employment does not increases in a bad market (Grip et al., 1997), and still others find an ambiguous relationship between economic conditions and atypical employment (Blanchflower, 2000). Grip and Basardi find that for couples, husbands' wages have no effect on women's decisions to work part-time, suggesting that, at least for women, economic constraints are not a

[2] "External flexibility" is adjusting labor inputs by hiring and firing workers in contrast to "internal flexibility" where firms adjust the workers' hours or switch workers' functions within the firm.

consideration in choosing part-time work (Grip et al., 1997; Bardasi and Gornick, 2000). In contrast, assuming that boom times are accompanied by unexpected demand for labor, unemployment rates could have the opposite effect with firms more likely to use fixed term workers during *unanticipated* periods of high economic activity (Pfeifer, 2005). This hypothesis contradicts the constrained worker hypothesis, since it posits that in a booming economy firms seek atypical workers, increasing the share of atypical employment, while the constrained worker hypothesis posits that in a booming economy workers can pressure employers to offer permanent employment, decreasing the share of atypical employment. The uncertain relationship between economic conditions and atypical employment become clear in the next section, where we explore the high levels of part-time work in the economically robust Dutch labor market and the high levels of self employment in the weaker Greek labor market. Economic conditions can also impact workers in different ways—in a bad economy workers desiring regular jobs can be forced into atypical jobs, but in a good economy, workers can choose atypical employment to engage in other activities. In contrast to fixed term and part time work, self employment has been consistently shown to be positively correlated with a weak economy.

The third hypothesis, entrepreneurial spirit, should be related to many types of atypical employment, as part-time, fixed term, and temp work all provide the flexibility for workers to start their own enterprizes while guaranteeing a secondary source of income. The concept of "entrepreneurial spirit" is hard to operationalize. The proportion of workers in self employment or the flows into self employment (or some combination of them, such as the TEA index) are the standard entrepreneurial variables (Chandler and Lyon, 2001; Gartner and Shane, 1995; Iversen et al., 2005). Of course, using

self employment to operationalize entrepreneurship is not a solution when predicting self employment. Further, self employment is not really a direct measure of entrepreneurship since it includes independent contractors and casual workers (for example selling food off a street cart) who would rather be employed. While it is difficult to capture empirically, theoretically entrepreneurship should encourage other forms of atypical employment.

Some of the most important motivations for atypical employment happen at the individual-level. For example, age and gender are important determinants of self employment since older men are the most likely and able to start their own businesses (Blanchflower, 2000) and women with young children are more likely to work part-time (Carr, 1996; Grip et al., 1997; Bardasi and Gornick, 2000). Part-time work is also more common among the very old and very young during partial retirement or one's studies (Grip et al., 1997). Personal values and experiences are also important determinants of atypical employment and both religion (or the social support associated with it) and exposure to entrepreneurship in one's family are said to encourage entrepreneurship (Carrol and Mosakowski, 1987). Also, firm-level factors are important determinants of atypical employment; service sector firms and seasonal industries are more likely to use atypical workers (Grip et al., 1997; Kalleberg, 2000).

3 Atypical employment

The OECD and Eurostat data used in this paper suggest that there is considerable variation in the level of atypical employment across countries, but that levels have been relatively stable and low since 1990. This contradicts several articles including the 2006 EU Green Paper on fixed term employment, which claims that up to 40% of the EU workforce was in atypical

employment in 1995 (EU, 2006). The OECD and Eurostat data actually suggest that the biggest increases in atypical employment occurred in the 1980's. Of course, trends in atypical employment are particularly difficult to operationalize since they can vary depending on whether data are reported by employers or employees, by grouping together different types of atypical employment, and by analyzing shorter time periods, extrapolating from small blips in an otherwise stable trend (Grip et al., 1997; LeBlansch et al., 2000; Keller and Seifert, 2005; Magnani, 2003). Figure 1 shows the level of self, part-time, and fixed term employment in 2005 for 16 EU countries and the levels of self and part-time employment for the US, Canada, New Zealand, Switzerland, Japan, and Australia. There are three outliers, one for each type of atypical employment. Spain has very high fixed term employment, Greece (and to a lesser extent the other Mediterranean countries) have more self employment, and the Netherlands has more part-time employment. The US has less self and part-time employment than most other countries in the dataset.

The first panel of figure 2 shows the time trends for the average percent of the workforce in atypical employment across all countries illustrated in figure 1.[3] Part-time and fixed term work have increased slowly while self employment has declined. The second panel illustrates a few representative countries: UK (Anglo-Saxon), Czech Republic (former eastern bloc), Sweden (Nordic), and Italy (Mediterranean), as well as France and Germany. Across *all* countries (including those not illustrated in the graphic- see table 1 for a list of countries) from 1990 to 2006 self employment was relatively stable with

[3]The average presented is just for Western Europe (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom) and is weighted by population. Non-Western European countries have sparsely available time trends, so they are not included. Including all countries, the trends are mostly the same, but the self employment line shifts up. Using an unweighted average (where Luxembourg is equivalent to Germany) has a similar trend as what is depicted here.

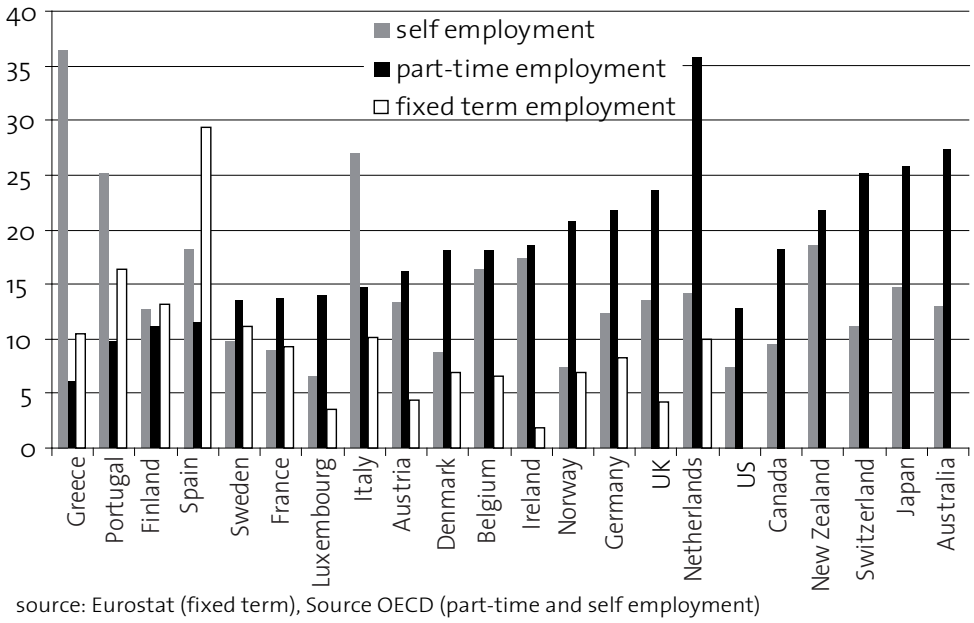

Figure 1: Levels of atypical employment by country, 2005

higher levels in poorer countries and recent small declines in all countries except the former eastern-bloc countries like the Czech Republic and Romania. Fixed term employment increased slightly in Europe, with the exception of Ireland and Norway where it declined, and Poland and Portugal, where it grew rapidly. Part-time work has increased in most countries (particularly Germany) with the exception of Iceland and the United States.

Descriptions of the three extreme cases (fixed term employment in Spain, self employment in Greece, and part-time employment in the Netherlands) suggest which of the three hypotheses are relevant and whether the quantitative analysis will capture them.

Approximately 30% of Spain's workforce is in fixed term employment, about twice that of any other European country. The original growth in fixed term contracts (from 10 to 30% of the workforce) occurred in the 1980's and was the consequence of both labor market policies and economic conditions.

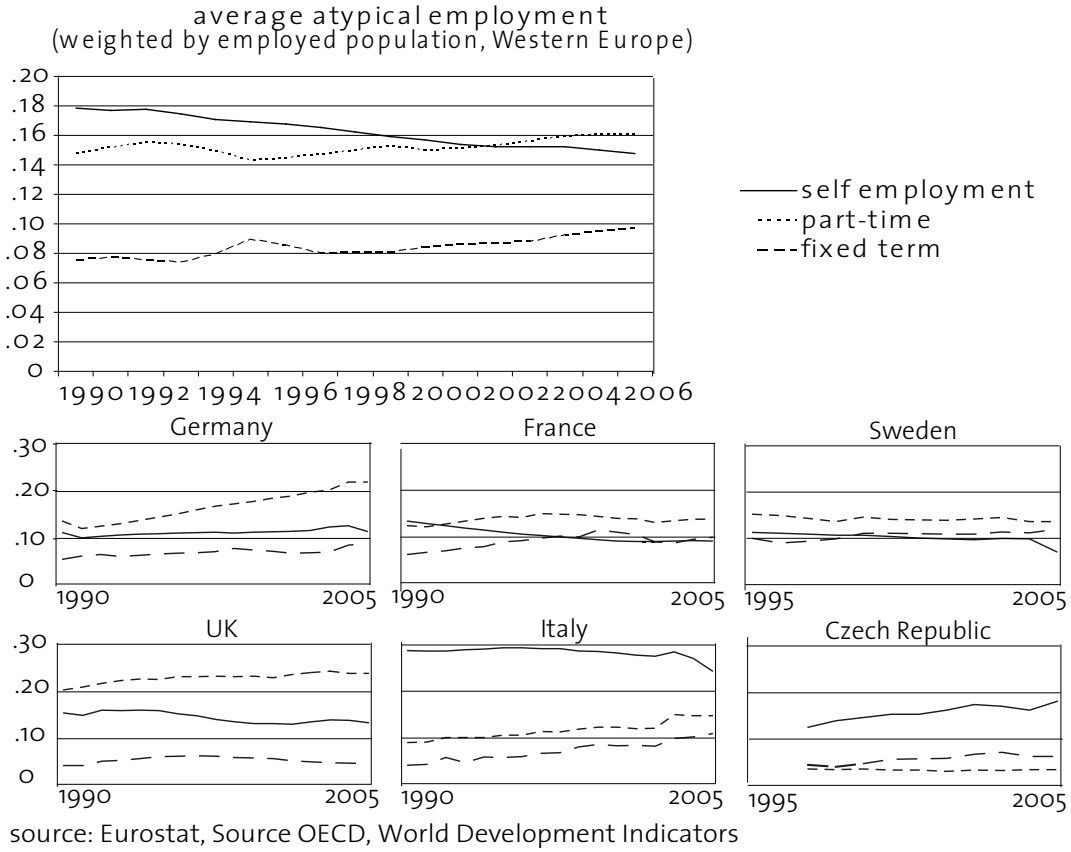

Figure 2: Trends in atypical employment

Under Franco's regime, and in the first few years following it, employment policy was centralized and employment protection was strict. Employment policy was dominated by Instituto Nacional de Empleo (INEM), a central clearinghouse that matched jobs and workers, and managed unemployment benefits, vocational training programs, and employment records. Originally, unemployed workers and firms with vacancies were obliged to register with INEM although by 1980, 90 percent of vacancies were filled independently. Centralized administration and strong worker protections were liberalized in 1980 under the pressure of rising unemployment rates (Dolado et al., 2002). The "Ley Basica de Empleo" or " Ley del Estatuto de los Trabajadores"

deregulated fixed term contracts, allowing them for temporary activities or as preliminary contracts for young workers. The law mandated equal wages for fixed term workers, reinforced private temporary work agencies' illegal status, and reaffirmed INEM's place as the central placement organization. This legislation allowed firms the first legal means to circumvent strict employment regulations, while at the same time reinforcing most constraints. In another attempt to reduce unemployment, fixed term contracts were liberalized in 1984 under the Worker's Statute Reform which allowed firms to use fixed term workers for permanent activities and created a new form of contract that endured a minimum of 6 months, and was renewable up to 3 years. Under this contract, after three years the worker had to be either permanently hired or replaced with 12 days of severance pay. The final step towards liberalizing atypical employment was legalizing temporary work agencies under Royal Decree 18 (1993), although in fact, temporary work agencies already existed in practice. Strict limitations on temporary work agencies exist to this day, as they must be officially registered and authorized as non-profits and are generally run by local governments, unions, or employers' associations.

In the early 1990's, when it became apparent that the liberalization of fixed term contracts had divided the labor market into separate and unequal sectors, the government began to relax the strict EPL governing regular employment contracts and increased constraints on fixed term employment, equalizing their legal status. In 1992, the typical 6 month-3 year renewal contract was changed to a 1 year contract, again renewable up to a total of 3 years. In 1994, this contract was restricted to hard-to-employ workers including those over 45 years old and the long-term unemployed. Finally, in 1997 the contract was entirely eliminated. In 1997 and 1998, laws 8/1997,

63/1997, and 15/1998 made small adjustments to the difference in EPL for fixed term and permanent employees and finally in 2001, dismissal costs for fixed term workers were introduced (8 days per year of service) (Izquierdo et al., 2005). The most recent limitations on fixed term employment were passed in 43/2006, "Reforma Laboral," a direct response to the 1999 EU directive demanding limits on either the number of fixed term contract renewals or their cumulative duration (MTAS, 2006). This law requires fixed term contracts to be justified by the employer as "training" or fulfilling "short-term production needs" such as specific projects or replacing employees on leave. The law specifies that contracts cannot endure beyond 2 contract cycles for a maximum of 24 months in a 30 month period, after which the worker automatically becomes a permanent employee. The reform also set tax benefits for firms converting fixed contracts to permanent ones, offering 850 euro for women, 1,200 euro for people over forty-five, 600 euro for the long-term unemployed, and 6,300 euro for the disabled with all bonuses annual and renewable for up to four years of employment, except the disabled bonus which endures indefinitely. According to the Spanish government, this legislation was successful: from 2005 to 2006, there was 108% growth in the rate of turnover from fixed to permanent contracts and in 2007 a full 42% of permanent contracts were initiated as indefinite contracts, compared to only 30.1% in December 2006 (MTAS, 2007b). This method can be strongly biased by the possibility that in recent years more people have started their jobs in fixed term employment. Correcting for this error Guell and Petrongolo (2007) finds there has been no increase in the hazard of transitions to permanent contracts.

In sum, Spain has come full circle, first supporting fixed term contracts as a solution to high unemployment, and then creating incentives for transitions

to permanent employment after realizing they created a two-tier system of employment. Despite the policy reversal, fixed term contracts are still more common in Spain than elsewhere in Europe. While some (Toharia, 1999) argue that Spain naturally has a labor market with a core/periphery structure that lends itself to two-tier employment, it seems more likely that the high rate of fixed term contracts is a historical legal legacy of the earlier policies (Rica, 2004; Mertens et al., 2007; Dolado et al., 2002, 2004; Davia and Hernanz, 2002; Toharia, 1999; Casals, 2004; Royo, 2005; Amuedo-Dorantes et al., 2006; Amuedo-Dorantes and Serrano-Padial, 2005; MTAS, 2007a). The econometric analysis will partially capture this dynamic, measuring the strictness of regular and fixed term workers' employment protection, but it will fail to capture the historical legacy of the 1980's.

This policy reversal, first liberalizing atypical employment and then bringing its regulation closer to that of regular employment (either through making atypical EPL stricter or loosening permanent worker EPL) is typical, albeit normally not as dramatic as in the Spanish case. For example, Germany, another country with strict EPL, liberalized atypical employment as an attempt to mitigate unemployment, legalizing temporary work agencies under the Loan Worker Employment Act (1972) and relaxing restrictions on fixed term employment in 1985. In 2000, the government tried to reverse course with the "Act of Part-time and Fixed Term Employment," which gave workers the right to switch to part-time work, required temp work to be used only for specific tasks, and limited the renewal of fixed term contracts to three years. In 2003, the Hartz Laws completed the reversal, increasing protections for atypical workers, forcing employers to pay health insurance and pension contributions for part-time workers (charging them an additional 2% wage tax), and promoting temporary work agencies as a *transition* to reg-

ular employment. As such, in Germany, as in Spain, there was a u-turn in policies, first promoting a two-tier system of employment as a solution to unemployment, and then attempting to equalize the two classes.

The second outlier in atypical employment is Greece, with 35% of its workforce self employed. Partly, the high self employment rate stems from the fact that the average firm size is only 2 employees compared to 6 in the EU (Mihail, 2003). Given that at least one worker in each small business is self employed, the predominance of small businesses should increase the proportion of self employed. In addition, Greece has strict EPL with high severance costs (higher for white collar than blue collar workers), strong minimum wage laws, and industry-wide collective agreements that all business owners in an industry must comply with regardless of whether they participated in negotiations (OECD, 2007; Kufidu and Mihail, 1999). This level of strict EPL and union power has been shown to encourage self employment (Cazes and Nesporova, 2003; Robson, 2003; OECD, 1999). In Greece, firms cannot circumvent strict EPL by using other forms of atypical employment since regulations on part-time, temporary, and fixed term work are also strict (Miaouli, 1998); self employment is the only way around the constraints. One caveat is that in practice small firms are able to circumvent EPL on overtime hours, dismissal policies, and to negotiate pay and bonuses individually, in defiance of union contracts (Mihail, 2003; Kufidu and Mihail, 1999). Thus, these small firms do not need to resort to "dependent self employment."

For more than half of the period covered by this study, self employed workers were entirely free of the regulations governing both permanent and other atypical workers in Greece. This changed in August 1998 when the Law on Industrial Relations required that agreements between self employed persons and companies be reported to the ministry of labor within 15 days

of the contract. If the contract is not registered, the relationship becomes that of regular employment in the eyes of the law (Kouzis, 2002). The goal of this initiative is to provide better estimates of how many self employed are actually self employed, as the self employment numbers prior to this law were exaggerated by employees masquerading as self employed. Since 1998 the courts have also enforced a more general definition of "employment." Currently, an employee is a worker who is subordinate, does not direct his or her work, does not determine his or her place of work or hours, and does not control his or her own performance. This new definition has been applied to reclassify dependent contractors as employees, giving them more protections, and thus equalizing their position with other workers. The full implications of reclassifying employees is elaborated on in the conclusion of this paper. There have been other moves towards closing the gap for contract workers. In March 2007, the Mediation and Arbitration Service demanded that any worker placed in a position of legal subordination to the employer has the right to be covered by the union contract. However, the relevant employer organization sought the reversal of this decision, which was not resolved at the time this paper was written. In sum, in the period covered by this study, free lance self employed workers were the only way around strict EPL although there have been recent attempts to remove this loophole.

There are several other factors contributing to Greece's high self employment rate. First, Greece has relatively high unemployment rates (around ten percent) and there is substantial evidence that self employment is positively correlated to unemployment, although the direction of causality is contested (Rissman, 2003; Blanchflower, 2000; Audretsch et al., 2006). In addition, tourism, an important economic sector for Mediterranean countries, might present more opportunities for self employment. For example, Italy, recog-

nizing tourism as a source of self employment opportunities, passed Act 236 in 1993, offering individuals financial aid and technical assistance to start their own tourism firms (OECD, 2000). The combination of EPL favoring self employment, relatively high unemployment, and a strong tourism sector all contribute to Greece's high incidence of self employment. The quantitative analysis will capture two of these three elements, missing tourism's possible contribution.

The third outlier is the Netherlands, which has an extremely high part-time employment rate, almost ten percentage points more than the next highest country, Australia. A full 66% of working women in the Netherlands work part-time compared with 30% in most EU countries; and the median employed woman works only 16 to 23 hours per week (Doorne-Huiskes, 2004). The high part-time employment rates seem to result from a combination of values, prosperity, and insufficient child care. In the Netherlands *both* men and women with children are more likely to reduce their working hours than other Europeans though married, less educated women with young children are the most likely to do so (Wel and Knijen, 2006). Further, part-time work is encouraged by legislation improving its standing relative to full-time work. In 1993 laws extended minimum wages and paid holidays to part-time workers working more than one-third normal hours, and in 1996 the provision was expanded to force full equality between all part-time and full-time work with prorated pay and benefits. Finally, in 2000, legislation allowed all workers to request the right to move between full and part-time work, requiring firms to accommodate these requests and to justify rejections. The government initially introduced legislation supporting part-time work when the country was experiencing high growth and needed to attract additional workers into the labor market (Plantenga, 1996). Unions supported the legislation

to prevent part-time workers from becoming a cheap substitute (Rasmussen et al., 2004). Further, child care is scarce and was not addressed by the government until the mid 2000's (Euwals, 2007), leaving part-time work as the primary option for working mothers. Surveys find that employed Dutch women actually prefer part-time employment, and more educated women prefer part-time work for *both* themselves and their partners (Wel and Knijen, 2006). Consequently, the Netherlands has one of the lowest *involuntary* part-time employment rates in Europe (Doorne-Huiskes, 2004). In sum, Dutch women prefer part-time work and the government encourages that preference through guaranteeing equal rights for part-time workers and by not putting a strong emphasis on child care needs. The quantitative analysis will find the relationship between the proportion of women in the marketplace and the high level of part-time work, the relationship between legislation and part-time work, and will suggest a weak negative relationship between economic constraints and part-time work, but will ignore both the importance of child care and cultural preferences.

For fixed term employment in Spain, self employment in Greece, and part-time employment in the Netherlands, it is clear that economic, legal, and cultural motivations are all at play. In Spain, fixed term work is primarily a legacy of legislative changes originally designed to combat high unemployment in the 1980's. In Greece, self employment is the result of the combination of high unemployment, strict EPL for both regular and atypical employment, and a strong tourism sector. Finally, in the Netherlands, part-time employment is the result of workers' preferences to balance family and work, economic prosperity, legal protections for part-time workers, and a limited supply of child care.

4 Research design

This study uses a series of predictors for atypical employment designed to capture the three hypotheses: "free-market seeking," "constrained individual," and "entrepreneurial spirit." The study also controls for the proportion of women in the labor force, a well-proven factor in part-time employment rates, and possibly a factor in other atypical employment rates. Data are drawn from a variety of sources (see the appendix) but primarily rely on OECD, ILO, and Eurostat statistics.

The first two variables related to the "free market seeking" hypothesis measure the proportion of the workforce belonging to a union (union density) (Checchi and Lucifora, 2003; OECD, 1990-2008) and the total number of strikes and lockouts per 100,000 population (ILO, 2004; UN, 2007). Many studies also use union coverage (how many workers are affected by collective agreements) because in some countries, like France, many more workers are covered by contracts than belong to unions.[4] The second union measure, the number of strikes and lockouts, is not as well standardized as union membership.[5] Union density and strike rates have been found by past research to be strong measures of union strength (Sullivan, 2006; Freeman and Medoff, 1984; Piazza, 2005). Union density ranges from 8 to 88% of the workforce in the OECD countries and has declined over time. Strikes and lockouts range from 0 to 25 per 100,000 population, with no discernable time trend.

[4] See OECD (2003b) chapter 3 for a discussion of the relationship between union coverage rates and union membership.

[5] A description can be found at `http://laborsta.ilo.org/applv8/data/c9e.html`. The ILO data comes from a variety of sources including employers, conciliation services, and newspapers. The method for counting strikes and lockouts is inconsistent across countries with some countries counting incidents by disputes and others by affected employers. Some countries also include definitions of minimum countable incidents. For example, Denmark does not count incidents lasting less than 10 days and has no minimum number of workers per incident while the US does not count events involving less than 1,000 workers and lasting less than one full shift (before 1982 the minimum was 6 employees). Portugal, with a middling level of strikes and lockouts, has no minimum rules for counting a strike or lockout.

Most countries have few incidents (Austria, Canada, Czech Republic, Estonia, Hungary, Japan, Netherlands, Romania, Sweden, Switzerland, UK, US) or infrequent activity (Belgium, Cyprus, Finland, France, Greece, Ireland, Italy, New Zealand, Norway, Portugal, and Spain). Only Denmark, Iceland, and Poland had high strike rates during the 1995-2006 period while Denmark had more activity during the 1998 general strike, and again in 2002 when the public sector contracts were renegotiated. Strong unions could have various effects on atypical employment. On one hand, unions impose constraints that firms seek to avoid through atypical employment (thus increasing atypical employment) but on the other hand, union negotiations often include clauses explicitly limiting atypical employment. This point is revisited in the policy section, where some recent trends in collective bargaining and atypical employment are summarized.

The next set of variables related to the free-market seeking hypothesis are two EPL indices published by OECD (1990-2008). The first index ranges from 0 to 6 and codes rules for dismissal notice and procedures, severance pay, and probationary hiring periods. A second index also ranging from 0 to 6 measures EPL for fixed term workers including: when fixed term work is allowed, the maximum number of contract renewals, and the maximum cumulative duration of renewed contracts.[6] A third variable (which, of course, can only be used concurrently with 1 of the 2 EPL indices) takes the difference between these two indices and should capture the relative advantage of using atypical workers. According to these three variables, regular EPL is most liberal in the US, UK, and Switzerland, while it is strictest in Portugal, Sweden, and the Netherlands. Regular EPL is relatively constant over time,

[6]Chapter 4 of the 2004 OECD Employment Outlook describes the EPL index construction. Of the countries included in my analysis, Austria and Greece have different EPL for blue collar workers. The OECD indices seem to use the blue collar rules.

with the few countries that altered their laws generally liberalizing (Spain, Portugal, Finland, and Austria). EPL for fixed term workers varies more and is stricter in Belgium, Greece, Italy, Spain, and Portugal while more liberal in the US, UK, Canada, and Switzerland. Belgium, Italy, Sweden, Portugal, Spain, Germany, Norway, Netherlands and Denmark all liberalized their policies between 1990 and 2006. By 2006 most countries had relatively liberal policies with the exception of Italy, Spain, Portugal, and France. EPL can also vary by occupation; Austria, Belgium, Denmark, Greece, France, and Italy all have stricter protections for white collar workers while Germany and Spain recently equalized such disparities.[7]

In the past several years two EU directives on atypical employment have passed and a third was proposed. In 1997, Directive 97/81/EC outlawed discrimination against part-time workers, mandated pro-rated pay, required the elimination of laws limiting part-time work, and encouraged firms to hear requests to move from full to part-time work (or vice versa). In 1999, Directive 99/70/EC outlawed discrimination against fixed term workers, required employers to inform fixed term workers about permanent opportunities, and mandated that national governments pass legislation doing one or more of the following: 1) specifying the circumstances under which fixed term contracts are permitted, 2) specifying the maximum total duration of renewed fixed term contracts and 3) limiting the number of permitted contract renewals. Finally, in 2002, Directive 0072 was proposed to prohibit discrimination against temp workers; to ensure temp workers have access to all workplace facilities, to require temp firms to pay workers for time between assignments; to ensure that temp workers receive overtime, breaks, and paid holidays; to require agencies to inform temp workers about permanent open-

[7]For other indices and discussion please see Deakin et al. (2007); Botero et al. (2004); WorldBank (2007).

ings; to prohibit temp agencies from charging workers fees; and to encourage unions to negotiate on behalf of temp workers along with permanent employees. This directive never passed. The EU directives affect several countries in this analysis, although some argue that they (or at least the part time directive) are too weak and not specific enough to have an impact anyhow (Jefferey, 1998). Different implementations of the directives are considered in the policy section of the paper.

The final variable related to the free market seeking hypothesis is non-compensation costs, the proportion of the firm's cost of hiring an employee beyond wages (BLS, 2007b; ILO, 2002).[8] In practice, the variable captures different aspects of labor policy in different countries. The variable was included to capture the United State's employer-based health insurance system, a costly component of regular employees' compensation and consequently a widely cited reason for US firms to use atypical contracts. Despite high health insurance costs, the US does not have extremely high non-compensation costs compared to other OECD countries since firms' payroll taxes[9] are relatively low. Between low taxes and high health care costs, American non-compensation costs are a middling 20 percent of wages. Countries with the lowest non-compensation costs are New Zealand and Denmark, while Belgium, France, Italy, and Sweden all have high non-compensation costs. Most countries have stable non-compensation costs over time with the exception of Poland which dramatically reduced them in the mid-1990's. Non-compensation costs measure both incentives for individuals to stay in regular employment when benefits are tied to the worker-employer relation-

[8] Two sources were used for this variable, one using all workers and the other using only production workers (values were almost identical for those countries covered by both sources).

[9] The term "payroll tax" generally refers to both taxes withheld from employees' paychecks for programs such as social security and taxes (such as unemployment insurance) paid by employers that are directly linked to employing a worker. Of course, here we refer to those payroll taxes paid by the employer, not the worker.

ship (e.g. health insurance in the US) or incentives to take atypical jobs when benefits are not contingent on the worker-employer relationship (social security). Thus, the hypothesized overall effect of non-compensation costs is unclear.

There are three variables related to the second hypothesis, constrained individual choices. The first, unemployment rates, measures whether difficult labor market conditions might force workers into atypical jobs.[10] Unemployment rates vary widely within and between countries. Countries with relatively constant unemployment rates over time include Switzerland, the United States, Luxembourg, Norway and Austria, while Finland, Spain, Sweden, and Ireland all had high unemployment in the 1990's followed by a later recovery. The Eastern European countries showed a steady increase in unemployment rates over the entire period.

The second variable related to "constrained individual choices" is a measure of real wages which was constructed using mean manufacturing wages (BLS, 2007b) and adjusting them using PPP exchange rates (WorldBank, 1990-2005) and the CPI-U inflation index (BLS, 2007a) to convert them to real manufacturing wages in 2006 dollars. Real wages are stable across time for all countries with slow steady growth. The only exception to this is Norway, which shows some fluctuations in the late 1990's.[11] Theoretically, as workers' real wages increase, they should be able to withstand longer periods of unemployment and be less pressed to accept atypical employment arrangements. On the other hand, as the Netherlands narrative demonstrated, individuals might be more eager to take flexible jobs in a more secure economic

[10] OECD data, standardized using ILO guidelines

[11] According to Johansen et al. (2007) Norway's manufacturing wages fluctuated based on the interaction between political party competition and the centralized wage bargaining institutions. The hypothesis is supported by the fact that the odd fluctuations in Norway's manufacturing wages correspond to a labor coalition's control of parliament from 1990 to 1997, 2000 to 2001, and in 2005.

environment. Prior work has shown that at least some proportion of workers are forced into these contracts based on poor economic conditions (Hiroki, 2001; Dearden, 1998).

The final variable related to "individual constraints" is unemployment insurance replacement rates, averaging replacement rates across several unemployment scenarios.[12] Denmark and the Netherlands have the highest unemployment insurance replacement rates while the US and the UK have the lowest. Unemployment replacement rates changed in several countries during this period: Italy increased benefits as did Switzerland and Ireland to a lesser extent, while Denmark first increased and then decreased them. This variable should measure whether workers are pressured into taking atypical employment or if they have the luxury of taking their time to look for a permanent job.

The third hypothesis, "entrepreneurial spirit," is the most difficult to measure. Traditionally, researchers use self employment, entry into self employment, and the TEA index (a measure combining self employment stocks and flows) (Gartner and Shane, 1995; Iversen et al., 2005; Chandler and Lyon, 2001). According to the TEA, the US was entrepreneurial in the late 1990's but less so in the 2000's while Romania and Estonia show consistent increases, and Sweden, Finland, and Belgium have consistently low entrepreneurship. Self employment is the most common measure of entrepreneurship, but is also a poor one, as it can indicate of a weak, rather than an innovative, economy. A third measure, the patent application rate, was also tested in this analysis. Unfortunately, the patent application rate is dominated by

[12]The measure was calculated by the OECD and is defined as the average of the gross unemployment benefit replacement rates for a worker with a full record of employment at two earnings levels (67% and 100% of average production worker earnings), in three family situations (single, married with dependent spouse, married with spouse in work) and for three unemployment spell durations (first year; second and third year; fourth and fifth year).

corporate, not individual, filings and it includes foreign innovators seeking protection in the domestic market. In fact, in the United States about 46% of patent applications are by US corporations while only 13% are individuals and the remainder are government and foreign applications (USPTO, 2007). Patent application rates tend to be low and constant within countries with the exception of Cyprus, Ireland, Estonia, Luxembourg, and Slovenia, which all grew over the period.

The last independent variables are controls. The first is the proportion of the labor force that is women. All countries had progressively more women in the labor force from 1995 to 2006. Denmark, Iceland, and Sweden all approached 50% of the labor force by the end of the period, while Spain and Italy only reached 40%. The gini coefficient was also tested as a control, as was a dummy for EU membership.

Data are inconsistently available across years and countries. Self employment and part-time employment come from the OECD while fixed term employment comes from Eurostat, and is thus only available for Europe. Table 1 shows the availability of the three dependent variables by country and year. Descriptive statistics for all variables are in table 5 in the appendix.

Correlations between independent variables are predominantly unrelated to one another as illustrated in table 2. All correlations take into account the panel data structure and are calculated as $((\beta_{x|y} * \beta_{y|x})^{.5})$ from two bivariate two-level regressions for each pair of variables. This is a simple back-door method since β is $\frac{cor_{xy}}{cor_x}$, so the product of the two beta's is simply $\frac{cor_{xy}^2}{cor_x * cor_y}$. Taking the square root gives the correlation coefficient, having adjusted for within country-correlation in the regression.

The different types of atypical employment have weak correlations, likely

	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06
Australia	o*	o*	o*	o*	o*	o*	o*	o*	o	o*	o*	o*	o*	o*	o*	o*	o*
Austria	*	*	*	*	*	o*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*
Belgium	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo	xo*	xo*
Canada	o*	o*	o*	o*	o*	o*	o*	o	o*	o	o*	o*	o*	o*	o*	o*	o*
Czech				o*	o*	o*	o*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*
Denmark	xo	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo	xo*	xo*
Finland	o*	o*	o*	o*	o*	xo*	xo*	xo*	xo*	xo	xo*	xo*	xo*	xo*	xo*	xo*	xo*
France	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo	xo*	xo*
Germany	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo	xo*	xo*
Greece	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo	xo*	xo*
Hungary			*	*	*	o*	o*	xo	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*
Iceland	o*	o*	o*	o*	o*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	x*	x*	x*	x*
Ireland	xo	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo	xo*	xo*
Italy	xo	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo	xo*	xo*
Japan	o*	o*	o*	o*	o*	o*	o*	o*	o*	o*	o*	o*	o*	o*	o*	o*	o*
Lithuania				*	*	*	*	*	x*	x*	x*	x*	x*	x*	x*	x*	x*
Luxembourg	xo*	xo*	xo*	xo*	xo*	xo*	xo	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo	xo*	xo*
Netherlands	xo*	xo*	xo*	xo*	xo*	xo*	xo	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo	xo*	xo*
N Zealand	o*	o*	o*	o*	o*	o*	o*	o*	o*	o*	o*	o*	o*	o*	o*	o*	o*
Norway	o*	o*	o*	o*	o*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*
Poland	*	*	*	*	*	*	*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*
Portugal	xo*	xo	xo	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo*	xo	xo*	xo*
Romania			*	*	*	*	*	x*	x*	x*	x*	x*	x*	x*	x*	x*	x*
Slovakia					o*	o*	o*	o*	xo*	xo*	xo*	xo	xo*	xo	xo*	xo*	xo*
Slovenia				*	*	*	x*	x*	x*	x*	x*	x*	x*	x*	x*	x*	x*
Spain	xo*	xo*	xo*	xo	xo	xo	xo	xo	xo*	xo*	xo	xo	xo*	xo*	xo	xo*	xo*
Sweden	o*	o*	o*	o*	o*	xo	xo	xo	xo	xo	xo*	xo*	xo	xo	xo*	xo*	xo*
Switzerland	o*	o*	o*	o*	o*	o*	o*	o*	o*	o*	o*	o*	o*	o*	o*	o*	o*
UK	xo*	xo*	xo*	xo	xo	xo	xo	xo	xo	xo	xo	xo	xo	xo	xo	xo	xo*
US	o*	o*	o*	o*	o*	o*	o*	o*	o*	o*	o*	o*	o*	o*	o*	o*	o*

x fixed term work
o part-time work
* self employment

Table 1: Dependent variable availability

	UD	SR	REPL	TEPL	DEPL	NCC	U	MW	UR	I	WW
union density	1										
strike/lockout rate	.073	1									
regular EPL	.036	.029	1								
short EPL	.14	.22	.081	1							
regular-short EPL	.14	.24	.24	.95	1						
non-compensation	.078	.080	.22	.091	.16	1					
unemployment	.19	.089	.044	.038	.016	.031	1				
manufacturing wage	.46	.21	.0042	.22	.20	.24	.21	1			
unemploy rep rate	.11	.0020	.091	.29	.25	.22	.051	.17	1		
innovation	.14	.037	.041	0	.0054	.20	0	.27	.073	1	
women working	.32	0	.27	.41	.31	.0026	.29	.34	.30	.29	1

Table 2: Correlations of independent variables

because they have distinct causes; fixed term employment is correlated with part-time and self employment with a Pearson correlation .15 and .084 respectively, while part-time and self employment have a .24 correlation. As

such, each of the three types of atypical employment are treated as separate dependent variables.

In pooled time-series data, observations are correlated across years and countries can also be correlated spatially, violating ordinary least squares (OLS) assumptions. To illustrate this correlation structure, the residuals from three OLS regressions predicting the proportion of the workforce in each type of atypical employment were correlated across pairs of years within countries for each regression. This tested not just for correlation across adjacent years, but across all temporal lags. The scatter plot in figure 3 shows the correlation between residuals for a pair of years on the x axis (e.g. the correlation between self employment residuals for 1998 and for 1999) and the difference in years on the y axis (1998-1999 = 1). Part-time work has a much stronger time correlation, and is correlated through all year lags.

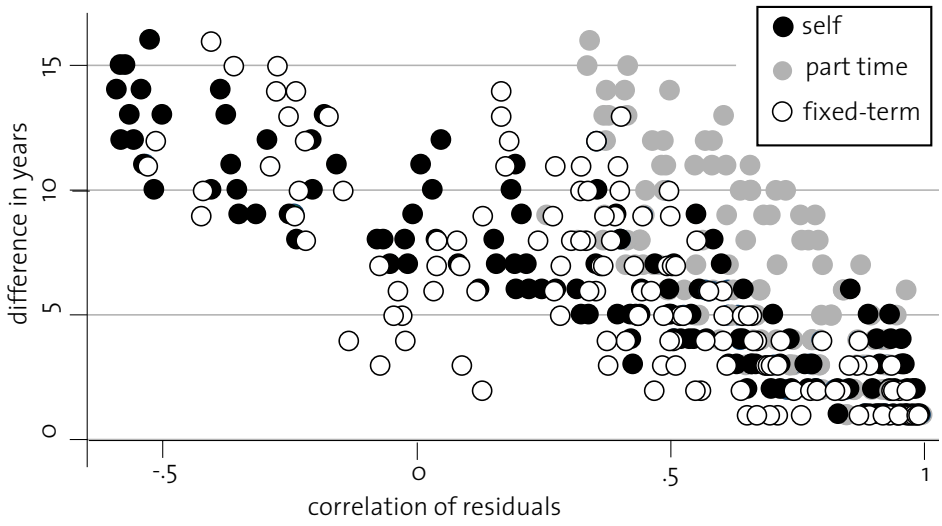

Figure 3: Correlation between residuals predicting atypical employment

There are several models that adjust for pooled time series correlation structures. First, there is a fixed effects model which transforms each variable

into a comparison between the country-year and the country-specific mean (which is the equivalent of using country dummy variables) or in other words uses exclusively within-country variance. In equation 1, Y_{ij} is the level of atypical employment in country i in year j, $\overline{Y}_i$ is the average level of atypical employment in country i over all periods j, X_{ij} is the set of independent variables for each country i in year j, and $\overline{X}_i$ is the mean of the independent variable for each country. The model intercept is β and γ is the vector of parameters weighting the independent variables. While this model deals with the correlation across time within countries, it ignores the variance between countries when estimating the parameters. This is a significant loss of information, particularly for those variables that are relatively static within countries, such as unemployment insurance replacement rates.

$$Y_{ij} - \overline{Y}_i = \beta + \gamma(X_{ij} - \overline{X}_i) + \epsilon_{ij}, \tag{1}$$

In comparison, model 2 uses a random error component (ϵ_{ij}), an error component specific to the country (ϵ_i) and a country-specific intercept ($\beta_{\bar{i}}$), while the effects of all the independent variables X are assumed to be the same for all countries. In this model, ϵ_i and β_i are random parameters that are not estimated along with the fixed parameters, but their variance is estimated along with ϵ_{ij}'s variance. The model reduces the total number of parameters from the fixed effects model and uses the variation between countries, as well as within, to estimate parameters. Just as the country-specific error is assumed to be drawn from a normal distribution (random effects), the country-specific intercepts are also assumed to follow a normal distribution.

I also tested models with random coefficients for each of the independent variables in this model. This model assumes that the independent variables'

coefficients vary by country (again drawn from a normal distribution).[13] For the temporary and self employment models, the simple random intercepts model in equation 2 was the best fit.

$$Y_{ij} = \beta_0 + \beta_{\bar{i}} + \gamma X + \epsilon_{ij} + \epsilon_i, \tag{2}$$

While atypical employment levels are correlated by country, it is also possible that they are correlated by time. For example, there could be a European recession, or perhaps organizational fads spread simultaneously. If this is the case, years are not only nested within countries, but countries are also nested within years, and a crossed random effects model is necessary.[14] This model is illustrated in equation 3, where μ_i and ν_j are the random intercepts for years and countries. The random intercept for a given year is shared by all countries and the random intercept for an individual country is shared by all time observations within that country. As in the other models, X_{ij} indicates the independent variables, while Y_{ij} indicates the outcome variable, one of the three types of atypical employment.

$$Y_{ij} = \beta_0 + \gamma X_{ij} + \mu_i + \nu_j + \epsilon_{ij}, \tag{3}$$

5 Results

Results from the fixed effects regressions show that the level of fixed term employment increases with union density, higher unemployment benefits, higher

[13] Both testing random coefficients models, and then for additional confirmation, running individual models by country, the effects of the independent variables were found to be similar for all countries, and thus the intercept model was sufficient.

[14] Crossed random effects models were tested and found to be the best model for predicting fixed term employment. The crossed effects model was compared to the nested model using a likelihood ratio test. Fixed term employment is the only atypical employment that required the crossed effects model. It could be that fixed term employment rates result from international organizational trends as it is a relatively new form of atypical employment.

wages, and more women in the workforce. In terms of the hypotheses, this suggests some support for the "free market seeking" hypothesis, if firms avoid union-imposed constraints through fixed term contracts. There are interesting results for "individual constraints," as higher real wages and unemployment benefits are related to *more* fixed term contracts—perhaps because individuals are less fearful of facing periods of unemployment between contracts and therefore more willing to take fixed term jobs. The entrepreneurial variables have weak findings, which is unsurprising given that entrepreneurship should also be a culture-specific variable. As such, the fixed effects regressions, which rely on within-country variation, control for time invariant cultural aspects of entrepreneurial culture. In table 3 σ_u and σ_e show the standard deviations of the residuals for the mean values for each country, and for the observations within each country while ρ indicates the fraction of the variance due to the country specific effect.[15]

Results from the random effects regression shows that part-time work increases when there are fewer strikes and lockouts, when real wages are higher, and when there are more women in the workforce. A higher strike rate probably discourages part-time employment because hours are normally included in union negotiations. The result for wages confirms the fixed term employment results; countries with higher mean wages have more part-time work. As expected, the proportion of women in the work force plays a significant role in predicting part-time work. There is little support for the three main hypotheses in this regression since strikes seem to discourage part-time work and a high income encourages it. Rather, the statistics seem to reinforce the

[15] A Hausmann test between fixed effects and random effects regressions finds p values of: fixed term employment =.000, part time work = .1093, and self employment = .0206. As such, I do not illustrate a random effects model for fixed term contracts since the country effects are correlated with the predictors and do not illustrate the fixed effects models for part time and self employment since the random effects model is superior.

	fixed term fe	pt employment re	self employment re
entrepreneurship			
patent app rates	6.13 (.856)	-13.09 (.393)	27.3 (.016)
self employment	.264 (.306)	.121 (.218)	-
employer constraints			
union density	.232 (.007)	-.029 (.261)	.006 (.772)
strike rates	-.124 (.107)	-.109 (.012)	.029 (.374)
regular EPL	-1.30 (.461)	-.664 (.336)	1.87 (.000)
reg-short EPL	.799 (.247)	.045 (.873)	.323 (.122)
non-comp costs	-.140 (.500)	-.058 (.522)	-.140 (.045)
worker constraints			
unemployment	.012 (.916)	-.024 (.660)	.276 (.000)
unemp replacement	.161 (.007)	.007 (.801)	-.034 (.085)
median income	.651 (.008)	.255 (.028)	-.352 (.000)
controls			
women	.588 (.090)	.878 (.000)	-.541 (.000)
constant	-44.0 (.068)	24.3 (.008)	45.0 (.000)
σ_u	11.61	4.86	4.61
σ_e	1.355	.797	.584
ρ	.987	.974	.984

() indicates the P value for the coefficient
σ_u indicates the sd of the estimated residual for mean country predictions
σ_e indicates the sd of the estimated residual for the within country predictions
ρ indicates the fraction of the variance due to countries

Table 3: Fixed and random effects coefficients

Netherlands' story: changes in part-time employment are not driven by tight economic conditions or firms' desires to circumvent union and government regulation, but rather, by a prosperous environment with union representation, where women are free to choose part-time work.

Finally, the random effects regression for self employment show that patent rates, stricter EPL, lower non-compensation costs, higher unemployment, lower unemployment benefits, lower wages, and fewer women in the workforce are all related to more self employment. This provides clear support for two hypotheses and mixed findings for the third. For "constrained individual choices," in a context of economic insecurity with low benefits and low wages, more individuals are self employed. With respect to the "free-market seeking

hypothesis," in a context of strict EPL there is more self employment (perhaps dependent self employed) though non-compensation costs (conceived of as a constraint on employers) actually decrease self employment. This could be because higher non-compensation costs fund a more secure safety net for workers, measuring something akin to the unemployment benefits variable. In part, they also measure the amount of benefits a worker receives from an employer, which should encourage workers to prefer regular employment. While the patent application rate effect might lend additional support to the entrepreneurial hypothesis, we consider the results tentative given the measure's aforementioned faults and the weakly significant results.[16]

While random and fixed effects are two of the most common methods to deal with pooled time series data, there could also be correlations between countries by year or predictors could have different slopes for different countries, two possibilities ignored up to this point. Table 4 shows in the first column a crossed effects regression with all variables for each type of atypical employment. The second column illustrates the "best" model; these are not necessarily the "best" in a strict hierarchy of statistical tests. Because data availability varied by variables, the most limited (like strikes and lockouts) were removed. Then several models were run with restricted samples including all remaining variables. These models were compared using a likelihood ratio test and once the significant variables were found, the model was rerun with the largest possible sample, omitting non-significant variables as necessary, to increase sample size by including observations for which the omitted variable was not available. Models tested include both crossed effects and

[16]Several models were run that are not presented here. These include several crossed effects models, interactions between EPL and unemployment, running the model with logit transforms of the atypical employment rates (because they vary between 0 and 1), and running effects by country groupings (Mediterranean vs. Anglo Saxon for example). Multiple diagnostics such as plots of quantiles of varname against quantiles of normal distributions, tests of the normality assumptions, and plots of predictions and residuals were run. The results are available upon request.

nested models with various combinations of controls including an interaction term between EPL and unemployment rates, designed to capture the effect of concurrent firm demand for atypical workers along with individual willingness to accept atypical employment. (This is not displayed because it was not significant.) Crossed effects were found unnecessary for the part-time and self employment models as the two models' coefficients were almost identical and the change in log likelihood was negligible. In contrast, the regressions for fixed term employment improved dramatically using crossed effects.[17]

	fixed term		pt employment		self employment	
	full	best	full	best	full	best
countries/observations	14/123	15/234	20/181	21/330	10/183	24/369
Fixed Part						
entrepreneurship						
patent app rates	-2.24	-	-11.99	-59.37***	25.05*	59.17**
self employment	.38*	-	.15	.32***	-	-
employer constraints						
union density	.12*	.20***	-.02	-.082***	.01	-
strike rates	-.12	-	-.11**	-	.03	-
regular EPL	-1.94	-1.0	-.52	-2.12***	1.91***	2.22***
reg-short EPL	.91	.51 *	-.084	.15	.36	-.69**
non-comp costs	-.04	-.43***	-.017	-.13*	-.18**	-.05
worker constraints						
unemployment	-.02	.13**	-.025	-.05	.28***	.19***
unemp replacement	.15**	.042	.01	.038	-.036	-
median income	.44*	-	.24*	.48***	-.30***	-
controls						
women	.3943	-.1851	.9486***	.8750***	-.4781***	-1.2968***
EU member	3.70	-	-.76	-	.43	-
Random Part						
country(sd cons)	8.07	9.02	5.93	5.53	6.83	13.65
year	.00035	1.52	.00025	-	.044	-
residual variability sd	1.31	1.25	.776	1.09	.58	2.87
Log Likelihood	-248.21	-458.02	-273.45	-559.68	-274.22	-764.22

*** P= .001, ** P =.01, * P =.05

Table 4: Crossed effects and best regression coefficients

[17]The random effects for the self employment equation were not normally distributed. Rerunning the model using a transformed dependent variable, $ln(\frac{proportionselfemployed}{proportionnotselfemployed})$, still yields non normal random effects, as tested by the skewness kurtosis test, Shapiro-Wilk test, and plots of the random effect against the normal distribution. Thus the last column of the table, the best self employment model, uses Stata's glamm commands using country level effects and robust standard errors.

For self employment and fixed term employment, the crossed effects and best models' findings mirror the results from the fixed and random effects models except that the gap between regular and temporary EPL seemed to slightly decrease self employment in the crossed model. The regressions for part-time employment do not contradict the fixed effects and random effects regressions, but removing some insignificant variables that limited the sample size brought formerly insignificant predictors into the significant range.

The "entrepreneurial spirit" hypothesis fares surprisingly well in these analyses. Patent rates are positively and significantly associated with self employment, as expected, but negatively associated with part-time work. Self employment is positively related to both fixed term and part-time work, as expected. Patent application rates might be associated with lower levels of part-time work because patent applications inadvertently measure the strength of certain economic sectors that hire more full-time workers. Also economies with high levels of self employment are found to have higher levels of part-time or fixed term employment. Presumably, this measures the cultural-entrepreneurship hypothesis.

There was mixed evidence for the "free-market seeking" hypothesis. First, union strength is related to more fixed term employment but to less part-time employment. This could result because working hours are included in union contracts (traditionally the case) but fixed term employment is not. This has changed in recent years; in the early 2000's union contracts began to limit fixed term employment, mandate fixed term workers' benefit levels, and even include clauses automatically converting fixed term workers to permanent positions (Campbell, 2005). As such, firms used to be able to escape union pressures through fixed term work but have never been able to do this through part-time employment. EPL, a more clear cut measure of the

"free-market seeking" hypothesis, has the anticipated effect of increasing self employment and a wide gap between EPL for regular and fixed term workers is associated with more fixed term employment and less self-employment, as shown in the regular versus short term EPL gap row of table 4. Surprisingly, stricter EPL is associated with *less* part-time employment which makes sense when part-time workers are covered by regular EPL, as in the case of the Netherlands or following 1997 EU directive guaranteeing part-time workers the same rights as full-time workers.[18] Overall, it seems that firms in countries with strict EPL and unions use both self and fixed term employment to avoid constraints, while part-time workers are prevented from playing the same role by union contract provisions and recently added legal protections.

Higher non-compensation costs are consistently and strongly linked with *less* atypical employment. Originally, this variable was included to measure constraints on firms, but it also measures the general strength of the safety net including those employer-provided benefits that might tie workers to regular jobs. In sum, the variable measures two opposing effects simultaneously: one binding workers to regular employment (e.g. health insurance in the US) and one offering a safety net that might make atypical work more feasible (e.g. unemployment insurance).

The most robust findings were for the "constrained individual choices" hypothesis. High unemployment rates are related to higher levels of fixed term and self employment while generous unemployment benefits also encourage fixed term employment, presumably because workers can bridge between assignments with public benefits. I hypothesized that an economy with high

[18]The negative relationship between EPL and part-time work is consistent over time, not increasing after the 1997 directive, when we test sub-periods. In addition, EPL's relationship to part-time work is not driven by the part-time outlier, the Netherlands, as the results hold excluding the Netherlands.

wages would have less of all forms of atypical employment, but in fact, wages are related to more fixed term and part-time employment. This is the relationship anticipated by the Netherlands story, where workers (particularly women) in a prosperous economy, willingly choose part-time work. In contrast, results show that in a more robust economy workers are *less* likely to become self employed. This confirms the literature we referred to at the beginning, which showing that self employment is often employment of last resort, and that prosperous economies consequently have less self employment. Regressions over shorter time periods (not shown here) suggest that the relationship between a weak labor market and self employment strengthened in the post-2000 period.

Finally, I confirmed the literature, finding that the proportion of workers in part-time employment increases with more women in the workforce and that the proportion of women in the workforce is negatively correlated with self employment rates.

Figure 4 shows the time trends for predicted and actual levels of atypical work in a few countries. Overall the models do a relatively good job of predicting trends. For the most part, smaller fluctuations are captured by the model, although it misses the recent decline and then partial rebound of self employment in Greece as well as the US's level of part-time work and predicts more variability in the Netherlands' part-time growth rates.

Figure 5 breaks down the predictions for two countries for each type of atypical employment in 2006, focusing on the three outliers examined in the qualitative narrative. In the figure each coefficient from the "best" model column in table 4 are used in combination with the original data for each country in 2006 (i.e. the percent of women in the labor market etc). This represents a decomposition of some of prediction points in figure 4. The

horizontal line indicates the sum of all components, leading to the overall prediction. Thus the model predicted for France that patent rates would contribute .-36, self employment 2.85, unions -.68, EPL -5.3, the difference in temp vs. regular EPL -.165, non-compensation costs -4.05 and so on, summing to a total prediction of 12.17% part-time employment. The number at the bottom of each bar indicates the actual atypical employment level; in this case, 13.6% of French employment in 2006 was part-time. While the model overall does a good job of predicting atypical employment, the random country effects are a big part of that prediction. While the variables of interest are statistically significant, they contribute significantly less than the predicted country random effects. From the narrative we might have expected the Netherlands' part-time prediction to be more driven by the women in the labor market and the high income, but, in fact, the women and income variables play a very similar role in predicting France's part-time employment rate. For fixed term employment, EPL plays a slightly larger role in predicting Spain's fixed term employment rate than the UK's, but fails to capture the dramatic roll we would expect. For self employment there is no visible difference between the two cases displayed beyond the country effects and the proportion of women in the labor force. This graphic draws our attention to how we need to look beyond the model's statistical significance. While the model has statistically significant effects in the expected directions and accurately predicts the countries' trends, it largely does so through countries' random effects, and very little through the explanatory variables of interest. While the magnitude of the fixed part of the regressions' effects is not large, it was still statistically significant. In this sense, the quantitative analysis did find significant results, but at the same time, our predictions suggest that the model did not capture the same information as our historical narratives

of Spain, the Netherlands, and Greece.

6 Conclusion

There was some support for the entrepreneurship hypothesis; countries with high levels of self employment have high levels of both part-time and fixed term employment, controlling for national constraints on firms' employment activities and on economic conditions. We can imagine then, that in a society that values entrepreneurship, workers use other forms of atypical employment as a means to meet their entrepreneurial goals. The results from the patent variable were sometimes significant in the expected directions, though overall, it was uncertain that the variable captured entrepreneurship as it is also related to the distribution of firm types in the country and is affected by exogenous factors such as international firms' interest in the country's market.

There were particularly interesting results for the "individual constraints" hypothesis. For all factors, as a country becomes more prosperous and has more social protections, there is less self employment. On the other hand, as the society becomes more prosperous and the social insurance expands, the levels of fixed term and part-time employment rise, perhaps because workers are more willing to reduce their work effort to take care of children or are willing to risk periods of unemployment between fixed term contracts. On the other hand, social benefits provided by employers through non-compensation costs seem to discourage atypical employment, encouraging workers to hold permanent regular jobs.

Finally, constraints on the firm, such as union strength and strong EPL, increase self employment and fixed term employment but discourage part-time work. Most likely, the early inclusion of part-time work in EPL, and its traditional inclusion in union contracts, excludes the opportunity for firms

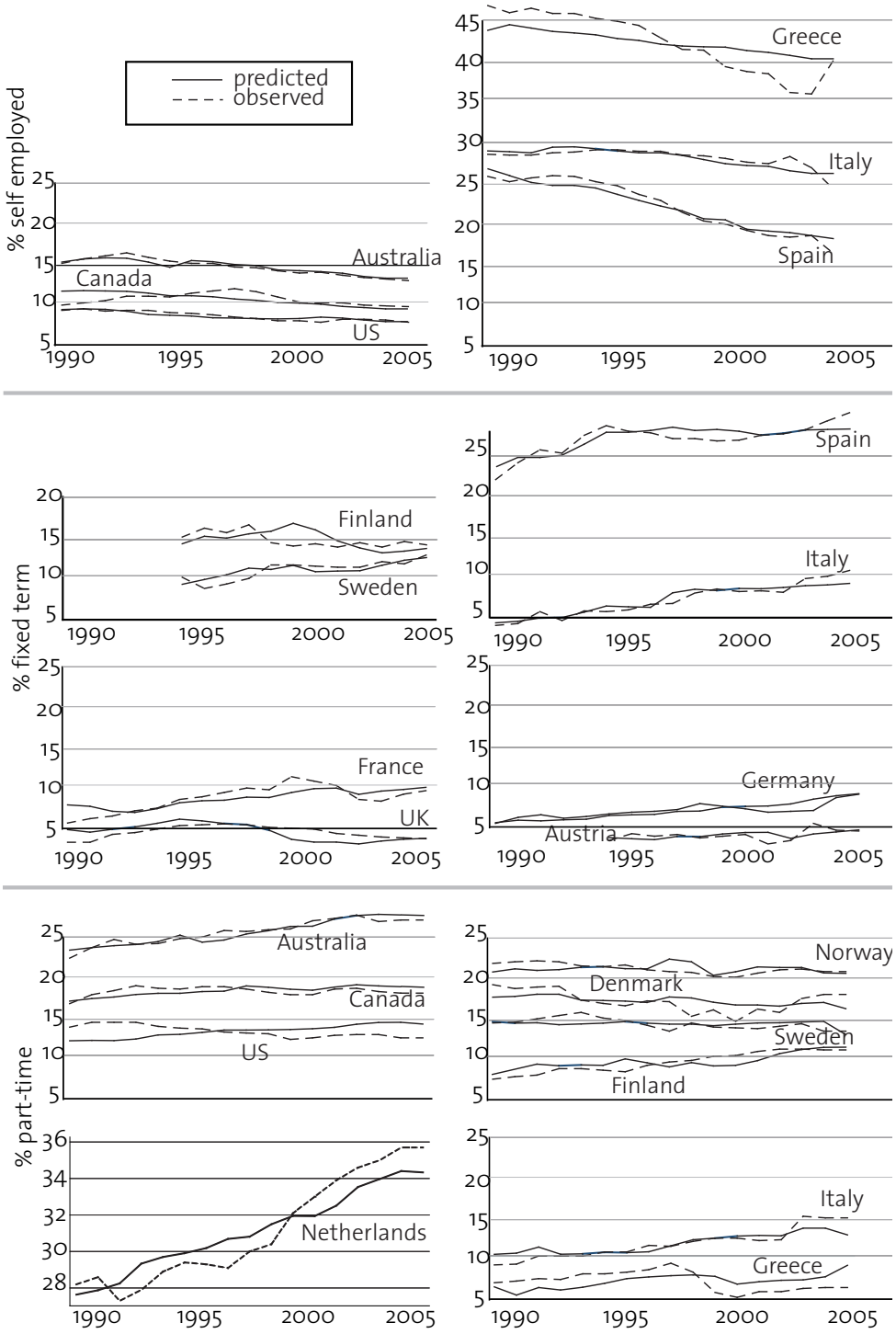

Figure 4: Predicted versus observed atypical employment

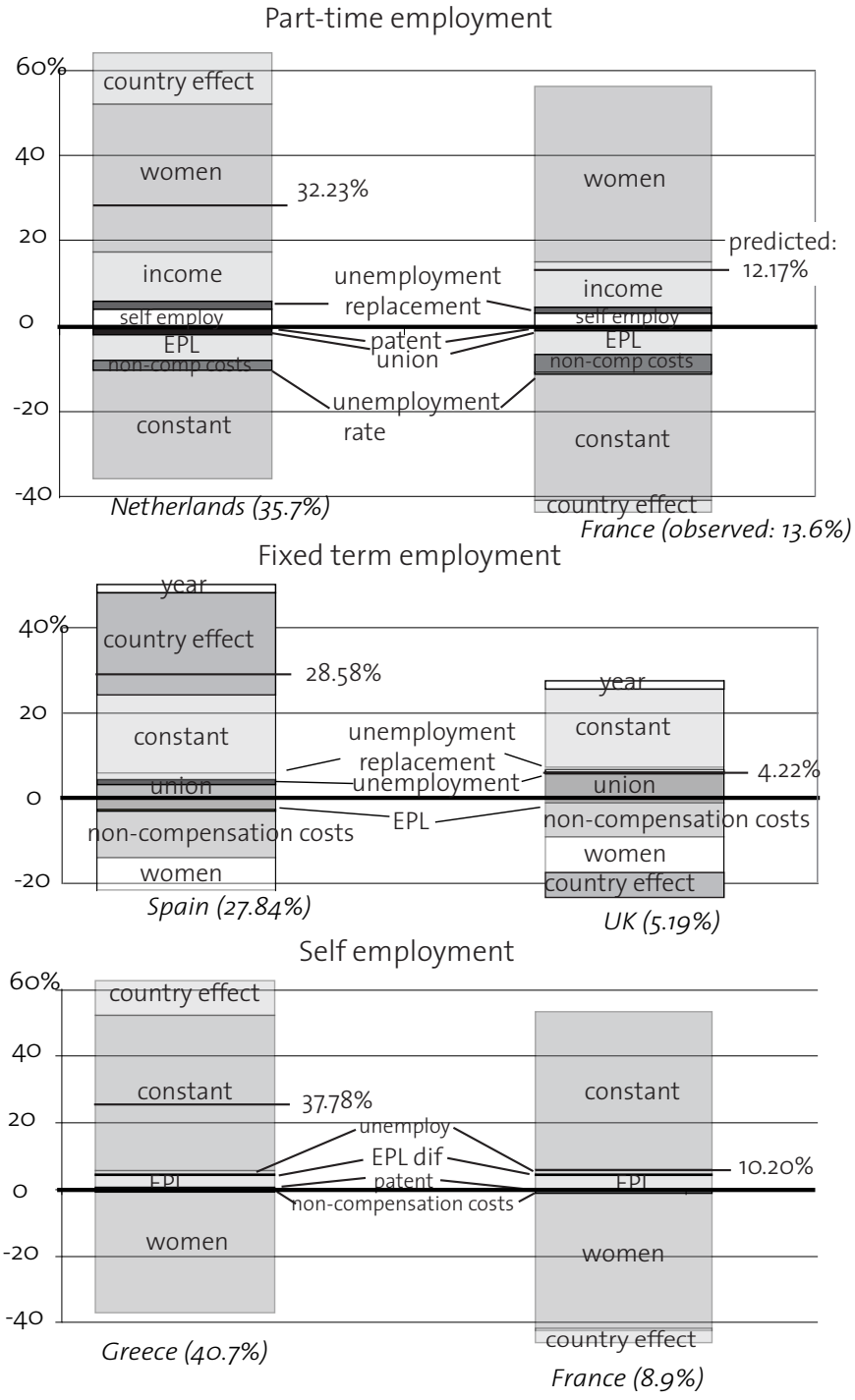

Figure 5: Decomposing predicted atypical employment for 6 cases in 2006

to circumvent constraints through part-time contracts.

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7 Appendix

	observations	mean	std dev	minimum	maximum
self employment	536	18.07	11.11	4.7	62
part-time employment	444	15.17	7.31	1.6	35.7
fixed term employment	351	7.96	5.65	.7	30.4
union density	480	37.51	20.51	8.1	88
strike rate	264	1.69	3.62	0	25.08
temporary EPL	388	1.97	1.35	.3	5.4
regular EPL	388	2.18	.91	.2	4.8
EPL difference	388	.21	1.28	-3.6	3.1
non-compensation costs	407	20.95	7.08	2.6	36.4
unemployment rate	467	7.71	4.11	.5	24.2
PPP manufacturing wage	402	20.43	5.83	7.56	29.77
UI replacement	356	30.18	12.29	3	65
innovation index	198	.38	.20	0	1
patent application rate	552	.030	.078	0	.56
proportion women	561	.44	.041	.34	.49
gini coefficient	470	.29	.043	.207	.41

Table 5: Descriptive statistics

Data Codebook

- `country`

  The name of the country

- `year`

  The year

- `pSelfEmployed`

  The percent of workers that are self-employed (Source: OECD)

- `stermEuro`

  Percentage of workers who are fixed term (Eurostat)

- `tempComp`

Percentage of workers who are temps (combined Eurostat and OECD). Not used because the two input variables did not correlate very well.

- `pt_oecd`

  Percentage of workers who are part time workers (OECD source)

- `uDensity`

  The percentage of workers who are members of a union. Ten years are from the OECD, every 5 years are from Checchi and Lucifora. These two data sources matched. Data post 2000 from Lawrence and Ishikawa were tested, but the numbers do not match.

- `strikesRat`

  Total strikes and lockouts per 100,000 people. Population is from the World Bank's World Development Indicators database. The number of strikes and lockouts are from the ILO's Yearbook of Labour Statistics. A strike is a temporary work stoppage effected by one or more groups of workers with a view to enforcing or resisting demands or expressing grievances, or supporting other workers in their demands or grievances. A lockout is a total or partial temporary closure of one or more places of employment, or the hindering of the normal work activities of employees, with one or more employers with a view to enforcing or resisting demands or expressing grievances or supporting other employers in their demands and grievances. Original data was collected from conciliation services and augmented with newspaper reports, worker's organizations, etc. A national strike is considered the same as a small firm-level strike.

- `ftEPL`

  This is a 0-6 point scale developed by the OECD in the "Employment Outlook" on employment protection legislation for fixed term employees. The index includes restrictions on types of work for which temp agencies is illegal, restrictions on number of renewals of contracts, maximum cumulated duration of contracts. The maximum number of successive contracts ranges from 1 (Netherlands and Belgium) to unlimited (UK, USA) and the maximum contract duration ranges from 12 months in Sweden to no limit in many OECD countries.

- `regEPL`

  This is a 0-6 point scale written by the OECD in the "Employment Outlook" on employment protection legislation for permanent employees. This index includes notification procedures, time delay before the firing process can start, length of notice before dismissal, severance pay, strictness of defining an unfair dismissal, length of probationary period when restrictions do not apply to firing the worker, length of compensation following the dismissal, and the possibility of reinstatement following the dismissal.

- `difEPL`

  The difference between the two EPL indices.

- `nonCompCost`

  This is the percent of average compensation costs that are not wages. These costs include payroll taxes paid by employers, as well as health insurance and pensions paid by employers. There are two sources for

this data, the BLS and the ILO. The estimates from the two organizations are almost identical for most years. As such, they are averaged them together for those years in which there are 2 years of data.

- `unemploy`

  The unemployment rate. This measure is reported by the OECD online database. They define unemployment using the ILO guidelines. These numbers differ from national accounts because they attempt to include those who are not registered with the unemployment office. The number is the unemployed population/civilian labor force and is seasonally adjusted.

- `gini`

  The country's post-transfer gini coefficient. This is pieced together from various sources including the World Development Indicators (World Bank), OECD, Luxembourg Income Study, US Census Bureau, and (Andrew Leigh 2004) for Australia. Almost all of these were almost identical with the exception of the BLS, which estimated much higher inequality than did the other sources. When multiple sources were available the average was used.

- `hWagePPP`

  The country's mean manufacturing wage, in 2006 dollars adjusted for PPP. Mean manufacturing wages come from the BLS Office of Foreign Labor Statistics. The PPP adjustments come from the World Bank's World Development Indicators database.

- `unemplRep`

  The replacement rate of unemployment benefits, indicating what percentage of his salary a worker receives on unemployment. This measure was generated by the OECD and is defined as the average of the gross unemployment benefit replacement rates for a worker with a full record of employment at two earnings levels (67% and 100% of average production worker earnings), in three family situations (single, married with dependent spouse, married with spouse in work), and with three different unemployment spell durations (first year; second and third year; fourth and fifth year).

- `innovate`

  This is a 0 to 1 scale measuring the level of innovation in a country. The first component is the total early-stage entrepreneurial activity (TEA index) which measures the total rate of early-stage entrepreneurial activity among the adult population aged 1864 years, inclusive. This is estimated by the Global Entrepreneurship Monitor. The second component is the firm birth rate from Eurostat. Each was standardized on a scale of 0-1 and then the average was used when both were available. The two measures had a correlation of .343** for those observations for which I had both measures. This is not used in presented results.

- `patent`

  The number of patent applications per person (patents from UN Statistical Division, population from the World Bank).

- `women`

This is a control indicating the percent of a workforce that is women (World Development Indicators)

- *Interpolation Note*

  Linear interpolation was used for gaps between two time periods of data. (i.e. if 1995 and 2000 were available, 1996-9 were interpolated while 90-94 and 2001-6 were left as missing. Labor policy was also interpolated which is inaccurate since policies happen at one moment in time, not gradually. However, this is conservative in that we assume that the policy change did not occur in any particular year.