

Aggregate Self-Employment Trends

Luca Nunziata*

University of Padua and IZA

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Abstract

This paper investigates the determinants of aggregate self-employment and entrepreneurship rates in the OECD. The empirical analysis shows that taxation plays a crucial role in shaping self-employment. This effect is heterogeneous across countries according to the degree of tax evasion, with taxation having a negative effect in countries with below-median tax evasion, and a positive effect in countries with above-median tax evasion. Employment protection legislation plays also a significant role, with workers being more reluctant to start up a business renouncing a protective framework. Self-employment is found highly pro-cyclical, being responsive to factors such as unemployment, hours and economic growth. However, this mechanism is shown to be heterogeneous across countries. Countries characterized by business starting costs above the OECD median display a significantly weaker pro-cyclical dynamics. In addition, countries with an informal economy estimated to be above the median are also characterized by significantly lower self-employment rates. These results are robust to alternative definitions of self-employment. More specifically, the correlations in the OECD sample survive even when self-employment is adjusted to account for business owners only.

1 Introduction

The literature on self-employment and entrepreneurship is fairly recent but has been fastly growing in the last decade. Most of the literature focus is on single countries experiences, although some recent analysis have provided a comprehensive analysis of self-employment in OECD countries¹. One of the question that has been addressed in previous studies is why self-employment is still low in most countries, despite a large share of the employed has been shown

*Department of Economics, Via del Santo 33, 35121, Padova, Italy. Email: luca.nunziata@unipd.it .

¹See for example Staber and Bogenhold (1993), Acs et al. (1994), Robson and Wren (1999) Blanchflower (2000), Blanchflower and Oswald (2001), Parker and Robson (2004) and Torrini (2005). See also the comprehensive analysis on self-employment and entrepreneurship in Parker (2004).

to prefer self-employment to dependent employment. A survey carried out on a sample of OECD countries in 1997 reported by Blanchflower and Oswald (2001) suggests that the proportion of individuals who would prefer to be self-employed is much larger than the actual self-employment level in most of these countries. There follows a theoretical and empirical question as why is this so. Blanchflower (2004) argue that this contradiction might be explained by the fact that one thing is reporting a preference for successful self-employment and another is starting a business with all the risks that it takes. The risks, the pressure and the stress that are associated with being self-employed could then be the reason why individuals rationally stay in dependent employment. Evans and Leighton (1989) argue that entrepreneurship might be subject to liquidity constraints. Using US micro data the authors show that individuals who benefit from larger family assets are more likely to become self-employed. If we believe in the direction of causation from family assets to entrepreneurship then, according to this interpretation, self-employment is constrained by lack of capital. However, as correctly argued by Blanchflower, an endogeneity problem may be at work, with more acquisitive individuals becoming entrepreneurs, working longer hours and accumulating larger family assets. In addition, individuals who inherit family businesses are more likely to be self-employed. This is indeed confirmed by the analysis in Blanchflower and Oswald (1998). Using British data from the National Child Development Study, the authors show that individuals are more likely to be self-employed if they received an inheritance or gift. In addition, when directly interviewed on the matter, potential self-employed indicate access to capital as their main obstacle. Similar results are found by Holtz-Eakin et al. (1994) and Lindh and Ohlsson (1996), respectively on US, and Swedish data. The importance of family inheritance, both in the form of wealth and human capital, in explaining entrepreneurship is confirmed by Laferrere and McEntee (1995) using the

1991 French Household Survey of Financial Assets.

Another strand of the literature focuses on the role of institutions. The dimensions that have been mostly investigated are minimum wage legislation, immigration and retirement policies, and taxation. Blau (1987) provides a time series analysis of self-employment in the US, suggesting that higher marginal tax rates in the upper income brackets may motivate high income individuals to become self-employed, given the relative ease of underreporting self-employment income. The analysis in Schuetze (1998) confirms that the tax advantages associated with self-employment are one of the reasons for becoming self-employed. Schuetze concentrates on US and Canada individual level data (Current Population Study and the Survey of Consumer Finances, respectively), estimating that a 30% increase in taxes is associated with an increase between 4.8% and 11.1% in the rate of male self-employment in incorporated and unincorporated businesses. A policy implication of this finding is that raising income taxes may result in a shift from dependent to self-employment, the latter being subject to lower tax rates. This would leave fewer tax paying employees that, as a result, may be required to pay even higher taxes. Parker and Robson (2004) suggest a negative effect of unemployment benefits on self-employment rates, while Torrini (2005) does not find any robust correlation with employment protection legislation.

Building on a model of consumer discrimination where White consumers dislike purchasing goods produced by minority self-employed workers, Borjas and Bronars (1989) find a rationale for the much lower self-employment rates among minorities in the US. According to their theoretical model, able minority workers are negatively selected into self employment because the gains from self-employment are smaller with respect to Whites. This would explain the observed 50% lower self-employment rates in the 1980s among Blacks and Hispanics with respect

to Whites, as well as the related earning differentials.

Some studies have concentrated on the cyclical aspects of self-employment. Evans and Leighton (1989) show that being a White unemployed almost doubles the probability of shifting to self-employment with respect to wage earners. However Blanchflower and Oswald (1998) find a strong negative correlation between county unemployment rates and the probability of being self-employed, in line with what found by Taylor (1996) using British Household Panel Study data.

1.1 A Look at the Data

Identifying who the self-employed are is not a simple task as the category includes entrepreneurs in the classic sense as well as unpaid family workers. The latter are individuals working within a family environment subject to alternative forms of remuneration than salary. Definitions often changes across countries, however the OECD has made progresses in trying to make the series comparable on a cross sectional basis. The OECD Economic Outlook publishes data on self-employment across countries that is displayed in Figure 1 as percent of total employment. Table 1 shows self-employment as percent of total civilian employment. Most countries experience a downward trend in self-employment with New Zealand, Portugal, Switzerland and the UK being the exceptions. This time pattern seems partially due to the secular reduction in the employment share in agriculture, displayed in Figure 2. As pointed out by the OECD Economic Outlook (2000) and Blanchflower (2000), the time series of non agricultural self-employment reverse the downward trend for a larger number of countries. According to the OECD Economic Outlook (2000) self-employment growth has been larger than civilian employment in most of the 1990s and has concentrated among the highest skilled groups and the fastest growing sectors

	1966	1976	1986	1990	1994	1998	1999	2000	2001	2002	2004
Australia	15.9	15.2	16.8	15.9	16.5	14.5	15.6	14.5	14.2	14.3	14.0
Austria	27.8	19.2	14.8	14.2	13.8	13.7	13.4	13.1	13.2	13.1	..
Belgium	21.9	16.7	18.1	18.1	18.8	18.2	17.8	..	..	..	..
Canada	14.8	9.7	9.7	9.5	10.8	11.8	11.4	10.6	9.9	9.8	9.5
Denmark	22.5	16.8	11.6	11.7	10.0	9.4	9.1	8.7	8.9	9.0	8.7
Finland	29.6	20.2	14.9	15.6	16.3	14.3	14.0	13.7	13.0	12.9	12.8
France	25.1	17.8	15.8	13.2	11.3	9.8	9.5	9.2	8.9	8.8	8.8
Germany	19.1	13.6	11.5	10.9	10.6	11.0	10.8	11.0	11.1	11.2	11.8
Greece	..	52.4	50.7	47.7	46.7	44.7	43.4	43.2	41.2	40.5	..
Iceland	18	15.1	13.5	15.1	18.4	17.9	17.7	18.0	16.8	16.6	14.1
Ireland	34.4	28.3	23.4	24.9	22.7	20.3	19.2	18.9	18.1	17.8	18.0
Italy	37.4	24.1	29.9	28.7	29.0	29.1	28.6	28.5	28.2	27.7	..
Japan	38	29.4	24.9	22.3	18.6	17.3	17.2	16.6	15.9	15.4	14.9
Luxembourg	22.4	15.4	11.3	9.4	7.8	7.1	6.8	7.3	7.0	6.9	..
Netherlands	18.5	12.7	11.3	11.6	12.3	11.8	11.3	12.0	11.5	11.6	..
New Zealand	14	14.1	17.9	19.7	21.1	20.4	21.2	20.8	19.9	19.4	19.2
Norway	22.5	14.8	12.7	11.3	9.7	8.3	7.8	7.4	7.2	7.1	7.4
Portugal	25.9	35.2	31.3	29.4	27.6	28.1	27.0	26.1	26.8	26.6	25.9
Spain	36.8	31.5	30	25.8	25.8	22.7	21.3	20.2	19.8	19.0	18.1
Sweden	13.1	8.2	6.5	9.2	11.1	10.6	10.6	10.3	10.0	9.8	9.9
Switzerland	..	..	..	..	12.7	14.0	14.0	13.2	12.9	12.4	11.3
United Kingdom	6.7	8	11.5	15.1	14.8	13.2	12.7	12.3	12.2	12.1	13.6
United States	12.7	9.3	8.9	8.8	8.8	7.9	7.7	7.4	7.4	7.2	7.6

As a percentage of total civilian employment (except 1966, 1976, 1986: percentage of all employed)

Source: 1966, 1976, 1986 from Blanchflower (2000), Table 2 and 1990 onward from OECD Factbook 2006

Table 1: Self-employment as percent of civilian employment

of the economy such as business and community services. The link between self-employment and dependent employment remains strong, with individuals changing state in both directions during their career. As regards job satisfaction, despite reporting poorer working conditions, longer hours and feeling of lower job security, self-employed individuals are more satisfied, possibly because of their higher degree of independence.

Figure 3 and 4 show the composition of self-employment across countries from 1992 to 2004 at most, across age groups and genders. We notice that the percentage of young workers among the self-employed has substantially decreased in some countries while it has remained fairly constant in others. Norway and the UK are the only countries experiencing a substantial trend reverse after 2000. As regards female self-employment, the share has been increasing since

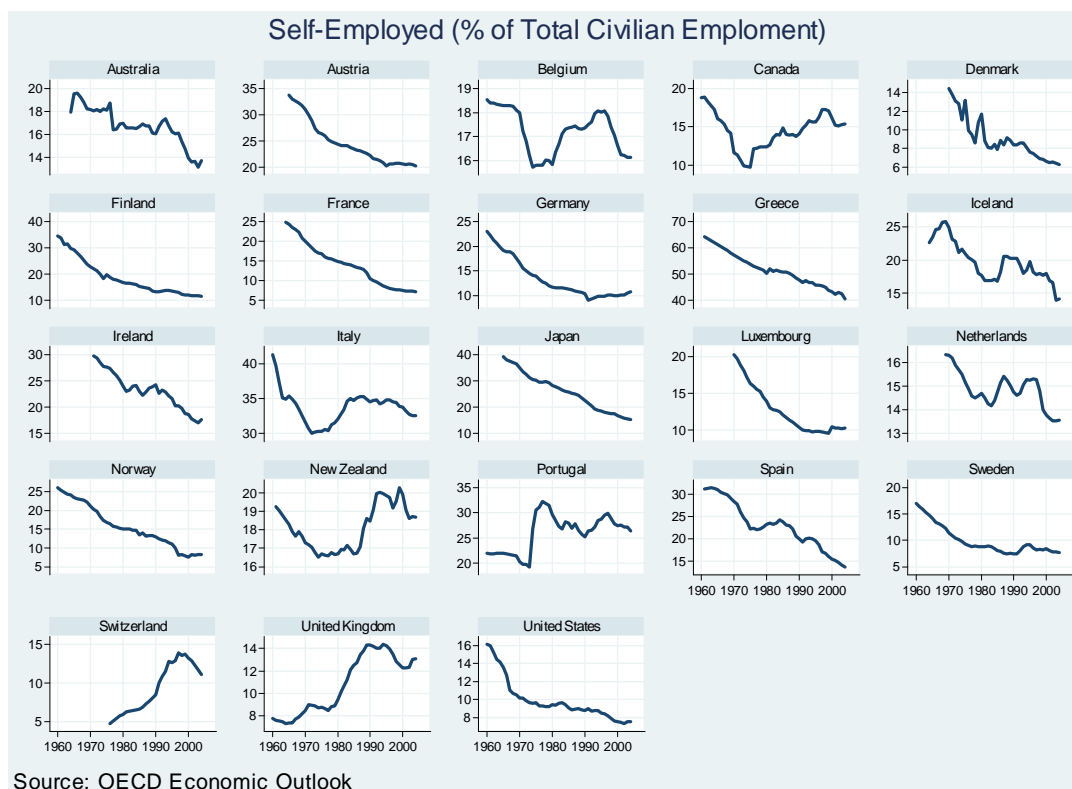


Figure 1: Self-employed as percent of total employment

the 1980s². After 1992 the evidence is mixed, with most of the countries displaying relatively constant rates.

Figures 5 and 6 show how job tenure evolved over the same years among the self-employed. Some countries, notably France, Ireland and Italy, are characterized by a positive trend in the proportion of self-employed with a job tenure of less than one year. On the contrary, most of the remaining countries display a positive trend in the percentage of self-employed with a job tenure of more than three years. If we concentrate on the sample of young workers, the positive trend of self-employed with a tenure of less than one year is more marked in France and Italy. In all cases though, tenure seems largely affected by cyclical factors.

²See OECD Economic Outlook (2000).

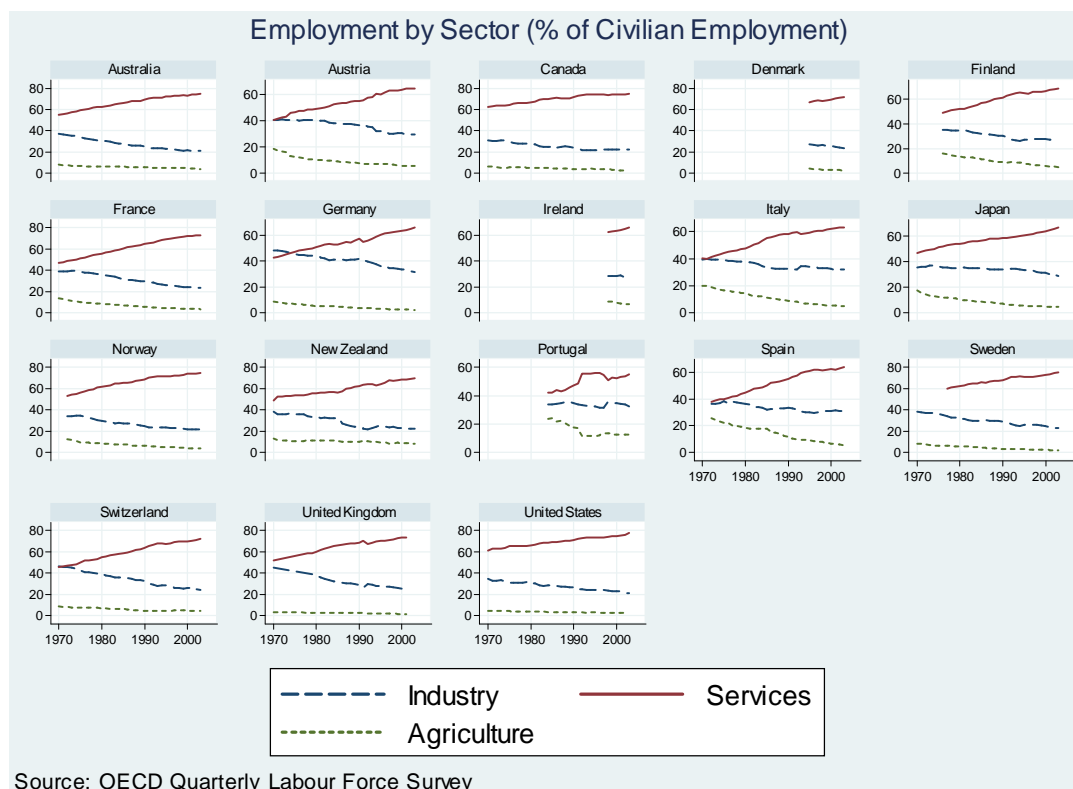


Figure 2: Employment by sector

2 The Empirical Analysis

The aim of this paper is trying to shed more light on the determinants of aggregate self-employment trends in OECD countries. Differently from previous papers in the literature, the focus of the analysis is on the impact of institutions regulating different aspects of the economy. Broadly speaking, I will concentrate on the role of institutions regulating labour and product markets as well as cultural and legal elements defining the functioning of the economy as a whole.

Tables 2 and 3 presents a set of multi-country models of self-employment. The 20 countries included in the sample are Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, Netherlands, Norway, New Zealand, Portugal, Spain, Sweden,

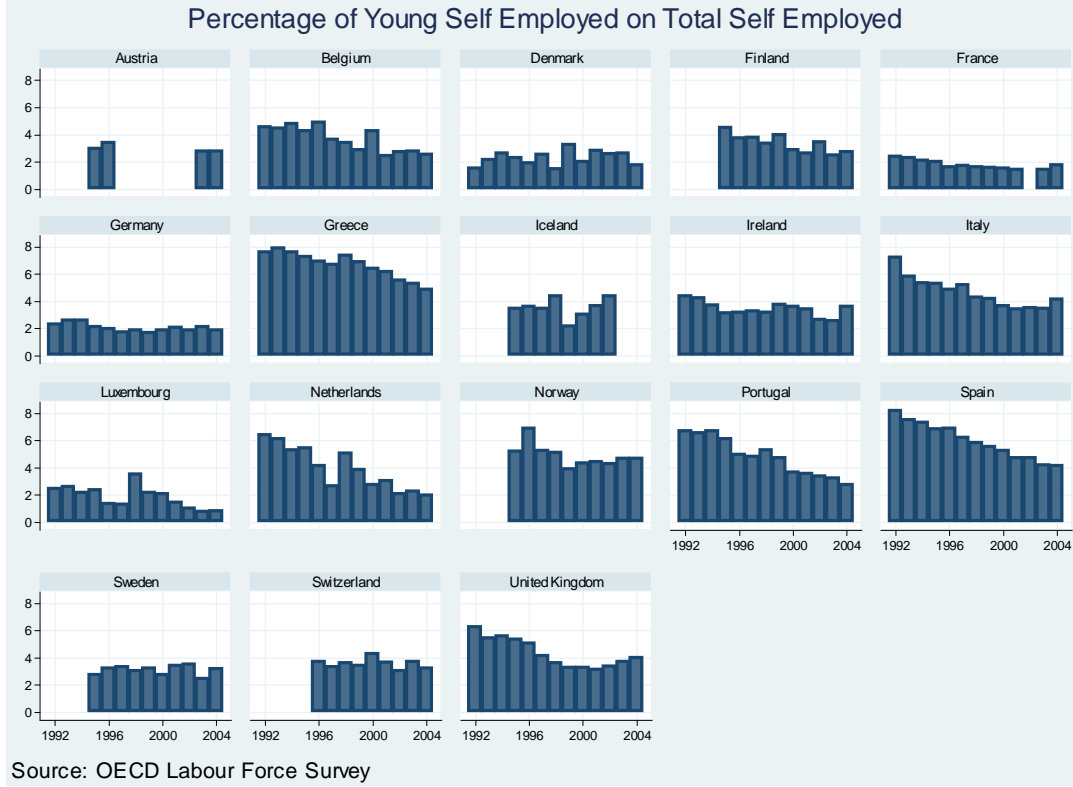


Figure 3: Young self-employment

Switzerland, United Kingdom and United States, observed at most from 1965 to 2002³.

The specification of the model is the following:

$$y_{it} = \alpha + \gamma' \mathbf{z} + \delta' \mathbf{x} + \mu_i + v_t + \varepsilon_{it} \quad (1)$$

where y_{it} is a measure of self-employment as percentage of total employment (or under alternative definitions), \mathbf{z} a vector of relevant institutions, and \mathbf{x} a set of macroeconomic controls. Country and time effects are controlled for by means of country and time dummies, respectively μ_i and v_t .

Among the institutional regressors we include measures of the tax wedge⁴ TW, the unem-

³Our sample is therefore much larger than previous studies. For example, Robson and Wren (1999) use at maximum 60 observations, Parker and Robson (2004) 110, and Torrini (2005) 488.

⁴See Nickell et al. (2005) for details on the variables.

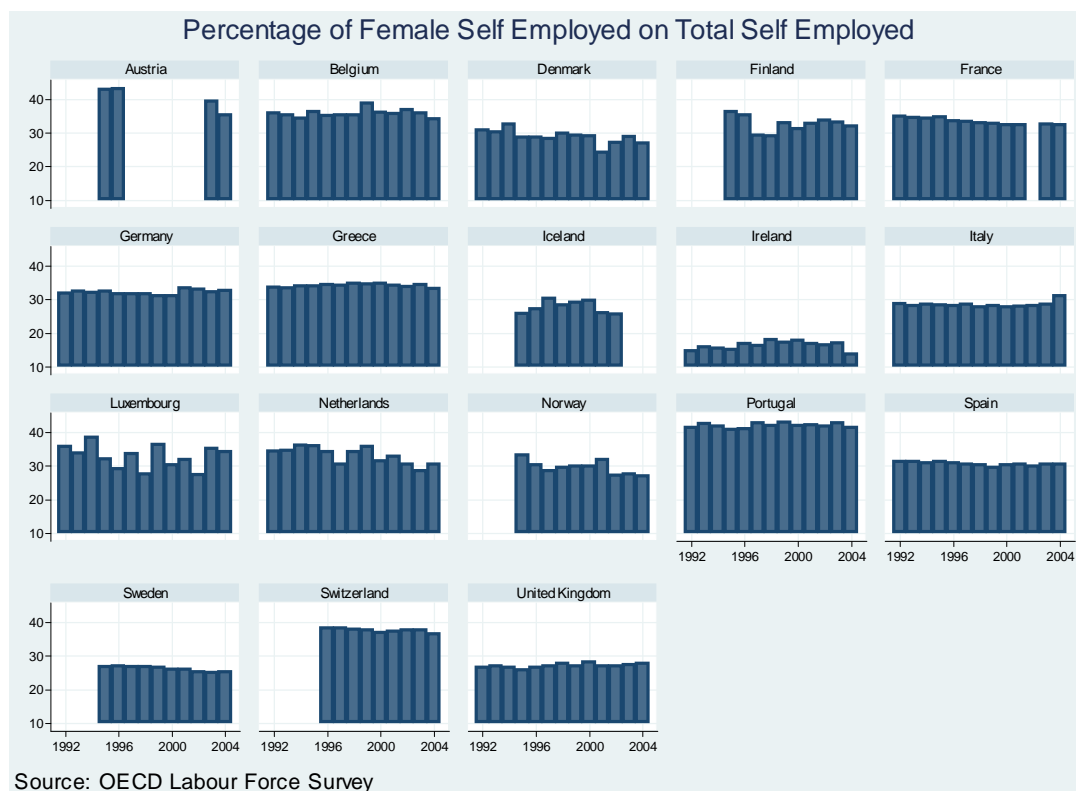


Figure 4: Female self-employment

ployment benefit (expressed as an index increasing in the generosity and the duration of the benefit provision), the employment protection legislation EP and of the minimum wage MW. Other controls include the unemployment rate UR, the proportion of male manual workers in manufacturing MMM, the employment share in agriculture, the employment share in the public sector, the long term real interest rate RIRL, the real oil price in logs, the rate of growth or alternatively the log real per capita GDP, average worked hours HOURS, the ratio of government primary balance to GDP and the ratio of government net financial liabilities to GDP.

Tables 2 and 3 around here

A crucial institutional factor suggested by the literature for explaining self-employment is taxation. Two contradictory effects might be at play here. On the one hand higher taxation



Figure 5: Job tenure, self-employment

represents a burden on entrepreneurship. On the other hand, higher taxation creates an incentive to enter into self-employment in order to pay lower taxes, both through lower marginal rates or tax evasion. This might explain why the coefficient of TW is not statistically significant in column (1). Attitudes towards tax evasion may consistently differ across countries, suggesting that there may be some degree of heterogeneity in the way taxes affect self-employment rates. One simple way to discriminate among countries according to their aggregate degree of tax evasion is using the index published by the Institute for Management Development. Dividing the countries according to their ranking with respect to the median, we construct a dummy variable equal to 1 in case of countries where tax evasion is common practice. The model in column (2) include an interaction term between TW and the dummy, therefore allowing an heterogeneous effect of TW in countries with tax evasion above the median. The estimation

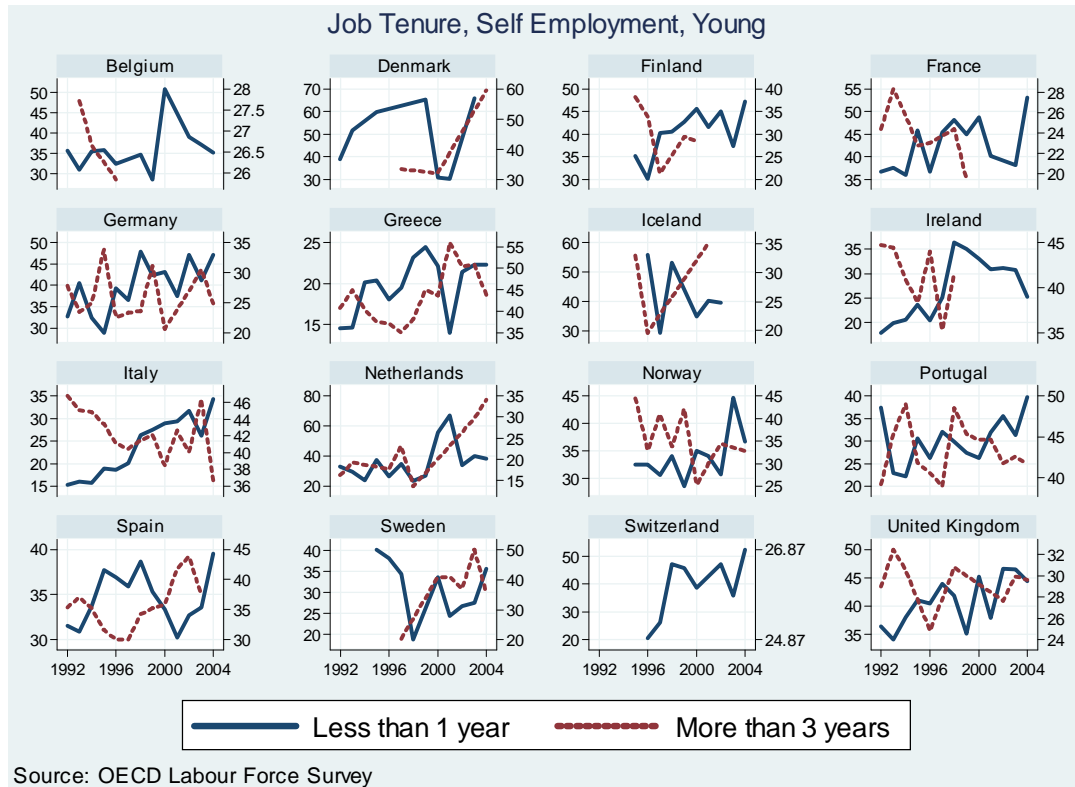


Figure 6: Job tenure, young self-employment

results confirm that TW has a negative effect in countries with below-median evasion, but the effect becomes positive in countries with above-median evasion⁵.

According to standard theoretical priors, dependent-employment-friendly institutions such as unemployment benefits, employment protection legislation and minimum wages should be negatively correlated with self-employment. Indeed, under a more protective institutional framework workers are more reluctant to start up a business renouncing employment protection, unemployment benefits or even the minimum wage in the case of the low-skilled. The empirical results show that EP is consistently significant and with expected negative sign across alternative specifications. Minimum wages are also significant with expected sign, while unemployment benefits are not significant, probably because they affect self-employment mainly

⁵This result is in line with what found by Torrini (2005) using a more general corruption index.

through unemployment. These results are in line with Blanchflower (2004) that views dependent employment as rationally chosen by individuals because of the lower content in stress and pressure. These characteristics are indeed related to the degree of employment protection.

The unemployment rate coefficient is found negative and significant, in line with the results of Blanchflower and Oswald. The rate of growth and hours are positively correlated with self-employment rates, as suggested by the literature. These results, together with the finding on unemployment, suggest that self-employment is highly responsive to cyclical factors. However, this mechanism is shown to be heterogeneous across countries. Countries characterized by business starting costs (as measured by Djankov et al, 2002) above the OECD median display a significantly weaker pro-cyclical dynamics. Another heterogeneous effects regards the dimension of the informal economy as a percentage of GNP, as estimated by the World Bank⁶. Countries with an informal economy above the median are characterized by significantly lower self-employment rates, as one would expect.

The log oil price, which can be considered a proxy for production costs, displays a robust negative correlation with self-employment. The real long-term interest rate is also significant with a positive coefficient, possibly because it reflects the economy-wide rate of return on capital investment. The employment share in agriculture is always significant with a positive coefficient, confirming that self-employment trends since the 1960s reflect the decline in the agricultural sector. The male manual employment in manufacturing and public employment are also significant, with negative sign, as one would expect.

One may wonder if the degree of unionization, UD, may affect the attitude of firms in favour of subcontractors, therefore indirectly affecting self-employment. This effect is identified in the data, with UD displaying a positive coefficient in most specifications.

⁶See World Bank, Doing Business (2007).

Columns (1) and (2) in Table 3 include, respectively, a control for the primary government balance and for the government net financial liabilities, both expressed as a percentage of GDP. These two variables are an indicator of the financial position of the government, and therefore may be considered as signals for future fiscal policy attitude⁷. Both variables are statistically significant with expected sign. In addition, the taxation coefficients are affected by the inclusion by these government controls, a further sign revealing the nature of the effect.

These results are robust to alternative definitions of self-employment. More specifically, the correlations in the OECD sample survive when substituting self-employment as % of total employment with self-employment population ratios (% of working age population) and self-employment rates (% of labour force). However, one may wonder if the independent variables affect in a similar fashion, business ownership, that represents a sub-category of self-employment that is particularly interesting for policy makers and the general economy dynamics. One simple way of estimating comparable series of business ownership rates for the 20 countries in our sample is regressing the series on business ownership rates constructed by the Netherlands Ministry of Economic Affairs⁸ every two years since 1970 on the self-employment share plus country dummies. The series on business ownership are calculated for the private sector, excluding agriculture, forestry and fishing, and for the total economy. Being the self-employment share series highly correlated with the business ownership series (with a correlation factor of 0.57 and 0.82, respectively) this procedure amounts to depurating the self-employment data from unpaid family workers and other categories of the sort. The fitted value of the regressions can be considered as an approximation of business ownership rates over the time span of our

⁷A lower surplus or an increase in the stock of government debt may indicate future increases in taxation that may take the form of higher marginal income tax rates and therefore may induce workers to shift to self-employment for the reasons outlined by Blau (1987).

⁸These are calculated every two years by the SCALES program, Scientific AnaLyses of Entrepreneurship SMEs, part of the SMEs and Entrepreneurship programme financed by the Netherlands Ministry of Economic Affairs.

sample. All the previous findings are robust to the change in the dependent variable.

A number of other robustness checks and experiments have been carried out with the baseline models. When a measure of education is included (average years of education) the estimated coefficient is positive, in line with previous findings in the literature, although not significant.

3 Conclusions

A set of multi-country models of self-employment is presented. Self-employment is shown to depend significantly on the declining share of agricultural employment. This may explain the decreasing trends since the 1960s. A crucial institutional factor suggested by the literature for explaining self-employment is taxation. Two contradictory effects might be at play here. On the one hand higher taxation represents a burden on entrepreneurship. On the other hand, higher taxation creates an incentive to enter into self-employment in order to pay lower taxes, both through lower marginal rates or tax evasion. The analysis allows for an heterogeneous effect of taxation in countries with tax evasion above the median. The estimation results confirm that taxation has a negative effect in countries with below-median tax evasion, but the effect becomes positive in countries with above-median tax evasion, suggesting an important role for the second-type mechanism. Under a more protective institutional framework workers are more reluctant to start up a business renouncing employment protection, unemployment benefits or even the minimum wage in the case of the low-skilled. The empirical results show that employment protection is consistently significant and with expected negative sign across alternative specifications. Minimum wages are also significant with expected sign, while unemployment benefits are not significant, probably because they affect self-employment mainly through unemployment. Union density is positively correlated with self-employment in most

SELF EMPLOYMENT % OF TOTAL EMPLOYMENT							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
UR	-0.138 (0.053)***	-0.180 (0.051)***	-0.183 (0.050)***	-0.183 (0.050)***	-0.190 (0.051)***	-0.116 (0.049)**	-0.226 (0.056)***
TW	1.583 (2.254)	-6.025 (2.665)**	-5.464 (2.689)**	-5.464 (2.689)**	-7.094 (3.023)**	-15.572 (3.562)***	-8.471 (2.938)***
UN BENEFIT	-0.029 (0.019)	-0.020 (0.018)	-0.018 (0.018)	-0.018 (0.018)	-0.022 (0.019)	-0.016 (0.023)	-0.037 (0.020)*
EP	-2.060 (0.325)***	-2.597 (0.349)***	-2.573 (0.345)***	-2.573 (0.345)***	-2.499 (0.330)***	-1.965 (0.311)***	-2.411 (0.341)***
MW	-0.020 (0.008)***	-0.015 (0.008)*	-0.017 (0.008)**	-0.017 (0.008)**	-0.017 (0.008)**	-0.016 (0.008)**	-0.012 (0.008)
RIRL	0.101 (0.038)***	0.098 (0.038)***	0.096 (0.038)**	0.096 (0.038)**	0.096 (0.037)**	0.069 (0.029)**	0.107 (0.037)***
AGR EMP. SHARE	0.324 (0.044)***	0.385 (0.046)***	0.379 (0.045)***	0.379 (0.045)***	0.398 (0.042)***	0.286 (0.040)***	0.294 (0.061)***
GROWTH	9.203 (4.253)**	10.166 (4.531)**	14.840 (5.006)***	14.840 (5.006)***	14.800 (4.785)***	9.163 (4.173)**	
MMM	-0.781 (0.078)***	-0.727 (0.082)***	-0.749 (0.082)***	-0.749 (0.082)***	-0.739 (0.079)***	-0.565 (0.075)***	-0.735 (0.079)***
OIL PRICE	-4.044 (0.422)***	-3.268 (0.464)***	-3.431 (0.468)***	-3.431 (0.468)***	-3.281 (0.465)***	-1.596 (0.522)***	-2.156 (0.507)***
TW*(H. EVS)		15.438 (2.715)***	14.709 (2.636)***	14.709 (2.636)***	15.310 (2.517)***	21.860 (2.682)***	14.211 (2.645)***
H. INFORMAL			-11.191 (5.579)**	-11.191 (5.579)**	-11.486 (5.496)**	-9.791 (5.977)	
				-3.170 (0.871)***	-3.892 (0.786)***	2.295 (1.880)	-2.978 (3.284)
UD					0.034 (0.013)***	0.007 (0.013)	0.026 (0.014)*
LRGDP							-4.172 (1.329)***
HOURS						0.012 (0.001)***	
Country dummies	yes	yes	yes	yes	yes	yes	yes
Time dummies	yes	yes	yes	yes	yes	yes	yes
Observations	706	706	706	706	706	648	706
Number of countries	20	20	20	20	20	20	20
R2	0.9370	0.9391	0.9393	0.9393	0.9398	0.9424	0.9396
RMSE	1.9613	1.9290	1.9268	1.9268	1.9202	1.8495	1.9207

Standard errors in parentheses
significant at 10%; ** significant at 5

Table 2: Self-employment regressions

	SELF EMPL %				ENTREPRENEURSHIP	
	TOT EMP	TOT EMP	WA POP	LAB FORCE	NON AGR	TOT ECO
	(1)	(2)	(3)	(4)	(5)	(6)
UR	-0.191 (0.049)***	-0.276 (0.051)***	-0.261 (0.027)***	-0.289 (0.044)***	-0.027 (0.007)***	-0.088 (0.024)***
TW	-7.178 (4.545)	6.103 (3.701)*	-3.861 (1.810)**	-6.858 (2.956)**	-0.802 (0.394)**	-2.631 (1.294)**
TW*(H. EVS)	17.466 (2.994)***	1.841 (3.813)	8.197 (1.427)***	13.059 (2.400)***	2.158 (0.387)***	7.082 (1.269)***
UN BENEFIT	-0.070 (0.023)***	-0.064 (0.023)***	-0.023 (0.012)*	-0.032 (0.017)*	-0.003 (0.003)	-0.009 (0.009)
EP	-2.384 (0.254)***	-2.384 (0.272)***	-1.694 (0.201)***	-2.213 (0.314)***	-0.377 (0.051)***	-1.239 (0.166)***
MW	-0.016 (0.007)**	-0.027 (0.013)**	-0.012 (0.005)***	-0.017 (0.008)**	-0.002 (0.001)**	-0.008 (0.004)**
RIRL	0.121 (0.038)***	0.090 (0.044)**	0.046 (0.020)**	0.064 (0.033)*	0.014 (0.006)**	0.046 (0.018)**
AGR EMP SHARE	0.326 (0.053)***	0.072 (0.078)	0.281 (0.021)***	0.407 (0.035)***	0.056 (0.007)***	0.182 (0.022)***
GROWTH	13.921 (5.880)**	16.067 (7.428)**	7.943 (2.878)***	15.434 (4.083)***	2.177 (0.734)***	7.145 (2.410)***
GROWTH*(H. STR)	-2.008 (6.658)	2.220 (9.268)	-1.584 (3.376)	-10.245 (5.088)**	-1.642 (0.818)**	-5.388 (2.686)**
H. INFORMAL	6.162 (2.104)***	-9.598 (1.762)***	-1.840 (0.553)***	-3.410 (0.755)***	-8.313 (0.128)***	-7.234 (0.419)***
UD	0.035 (0.013)***	0.064 (0.015)***	0.022 (0.007)***	0.036 (0.012)***		
MMM	-0.569 (0.096)***	-0.920 (0.097)***	-0.569 (0.044)***	-0.711 (0.075)***	-0.110 (0.012)***	-0.361 (0.039)***
OIL PRICE	-3.232 (0.558)***	-5.684 (0.697)***	-2.095 (0.269)***	-3.008 (0.466)***	-0.503 (0.069)***	-1.652 (0.226)***
GOV P. BAL % GDP	-0.094 (0.048)*					
GOV DEBT % GDP		0.017 (0.005)***				
Country dummies	yes	yes	yes	yes	yes	yes
Time dummies	yes	yes	yes	yes	yes	yes
Observations	630	528	706	669	706	706
Number of countries	20	19	20	20	20	20
R2	0.9488	0.9535	0.9324	0.9428	0.9902	0.9555
RMSE	1.8160	1.7097	1.2684	1.7897	0.2827	0.9276

Standard errors in parentheses

*** significant at 10%; ** significant at 5

Table 3: Self-employment and entrepreneurship regressions

specifications. This result is in accordance to the view that unions affect the attitude of firms in favour of subcontractors, therefore indirectly affecting self-employment.

Self-employment is found highly responsive to cyclical factors such as unemployment and economic growth. Both effects point to a pro-cyclical dynamics for self-employment. However, this mechanism is shown to be heterogeneous across countries. Countries characterized by business starting costs above the OECD median display a significantly weaker pro-cyclical dynamics. Another heterogeneous effects regards the dimension of the informal economy. Countries with an informal economy estimated to be above the median are also characterized by significantly lower self-employment rates. These results are robust to alternative definitions of self-employment. More specifically, the correlations in the OECD sample survive even when self-employment is adjusted to account for business owners only.

References

- [1] Z. Acs, D. Audretsch, and D. Evans. Why does the self-employment rate vary across countries and over time? *CEPR Discussion Paper*, (871), 1994.
- [2] D. Blanchflower. Self-employment in OECD countries. *Labour Economics*, 7(5):471–505, September 2000.
- [3] D. Blanchflower. Self-employment: More may not be better. *Swedish Economic Policy Review*, 11:15–73, 2004.
- [4] D. Blanchflower and A. Oswald. What makes an entrepreneur? evidence on inheritances and capital constraints. *Journal of Labor Economics*, 16(1):26–60, January 1998.
- [5] David Blanchflower, A. Oswald, and A. Stutzer. Latent entrepreneurship across nations. *European Economic Review*, 45:680–691, 2001.
- [6] D. Blau. A time-series analysis of self-employment in the United States. *Journal of Political Economy*, 95:445–467, 1987.
- [7] G. Borjas and S. Bronars. Consumer discrimination and self-employment. *Journal of Political Economy*, 97:581–605, 1989.
- [8] D. Evans and L. Leighton. Some empirical aspects of entrepreneurship. *American Economic Review*, 79:519–535, 1989.
- [9] D. Holtz-Eakin, D. Joulfaian, and H. Rosen. Entrepreneurial decisions and liquidity constraints. *Journal of Political Economy*, 102:53–75, 1994.
- [10] IMD. *World Competitiveness Yearbook*. Institute for Management Development, 2002.

- [11] A. LaFerrere and P. McEntee P. Self-employment and intergenerational transfers of physical and human capital: An empirical analysis of french data. *Economic and Social Review*, 27(1):43–54, October 1996.
- [12] T. Lindh and H. Ohlsson. Self-employment and windfall gains: Evidence from the Swedish lottery. *Economic Journal*, 106(439):1515–1526, November 1996.
- [13] OECD. The partial renaissance of self-employment. In *Economic Outlook*, chapter 5. OECD, Paris, 2000.
- [14] S. Parker and M. Robson. Explaining international variations self-employment: Evidence panel of oecd countries. *Southern Economic Journal*, 71(2):287–301, 2004.
- [15] Simon C. Parker. *The Economics of Self-Employment and Entrepreneurship*. Cambridge University Press, Cambridge, MA, 2004.
- [16] M. Robson and C. Wren. Marginal and average tax rates and the incentive for self-employment. *Southern Economic Journal*, 65:757–773, 1999.
- [17] H. Schuetze. Taxes, economic conditions and recent trends in male self-employment: a canada-us comparison. *Labour Economics*, 7:507–544, 2000.
- [18] U. Staber and D. Bogenhold. Self-employment: a study of seventeen OECD Countries. *Industrial Relations Journal*, 24:126–137, 1993.
- [19] M. Taylor. Earnings, independence or unemployment; why become self-employed? *Oxford Bulletin of Economics and Statistics*, 58(2):253–265, 1996.
- [20] R. Torrini. Cross-country differences in self-employment rates: the role of institutions. *Labour Economics*, 12:661–683, 2004.

- [21] André van Stel. Compendia: Comparative entrepreneurship data for international analysis. SCALES-initiative (Scientific AnaLyses of Entrepreneurship SMEs), part of the SMEs and Entrepreneurship programme financed by the Netherlands Ministry of Economic Affairs, 2002.

	Variable	Obs	Mean	Std. Dev.	Min	Max
	Self-Employment % Total Employment	706	16.966	7.442	4.806	39.680
	Self-Employment % W.a. Population	706	11.113	4.637	3.644	26.720
	Self-Employment % Lab. Force	669	15.945	7.091	4.776	38.180
Entrepreneurship rate (Business owners % Lab. Force, non. Agr., estimated)		706	10.114	2.711	6.449	17.377
Entrepreneurship rate (Business owners % Lab. Force, total, estimated)		706	14.040	4.183	7.625	24.193
	Unemployment rate	706	6.105	4.231	0.000	24.171
	Tax wedge	706	0.479	0.127	0.172	0.831
	Tax wedge * (high tax evasion dummy)	706	0.243	0.269	0.000	0.831
	Unemployment benefit	706	18.435	15.530	0.000	68.500
	Employment protection	706	1.986	1.133	0.000	4.075
	Minimum Wage	706	18.633	23.946	0.000	64.959
	Real Long Term interest rate	706	3.274	3.324	-11.488	14.209
	Employment share in agriculture	706	8.515	6.039	1.394	34.297
	Growth rate	706	0.024	0.023	-0.072	0.101
	Growth rate * (high starting business costs)	706	0.012	0.021	-0.053	0.101
	High informal economy	706	0.504	0.500	0.000	1.000
	Union density	706	40.992	19.309	8.300	88.600
	Male manual employment share in manufacturing	706	22.681	4.656	13.629	34.558
	Log oil price in \$	706	2.526	0.927	0.742	3.602
	Annual working hours	648	1758.380	178.726	1338.000	2242.723
	Log GDP per capita	706	-7.997	1.385	-9.698	-3.211
	Primary balance (% GDP)	630	2.193	2.158	-4.722	12.990
	Government net financial liabilities (% GDP)	528	37.658	27.160	-17.291	123.160
	Informal Economy Estimate (% GNP)	706	16.300	4.882	8.800	27.000
	Tax evasion common practice index	706	1.382	0.467	0.949	3.030
	Cost of Starting a Business (%GNI percapita)	706	40.091	50.375	0.000	166.250

Table 4: Data summary

Appendix

Data Definitions and Sources

Self-Employment % Total Employment: OECD Economic Outlook and author's calculations.

Self-Employment % W.a. Population: OECD Economic Outlook and author's calculations.

Self-Employment % Lab. Force: OECD Economic Outlook and author's calculations.

Entrepreneurship rate (Business owners % Lab. Force, non. Agr., estimated): estimated

from a regression of business owners in the private non-agricultural sector % of labor force (calculated every two years by the SCALES program, Scientific AnaLyses of Entrepreneurship SMEs, part of the SMEs and Entrepreneurship programme financed by the Netherlands Ministry of Economic Affairs) on self-employment share plus country dummies. The variable consists of the fitted values of the regression.

Entrepreneurship rate (Business owners % Lab. Force, total, estimated): estimated from a regression of total business owners in the economy % of labor force (calculated every two years by the SCALES program) on self-employment share plus country dummies. The variable consists of the fitted values of the regression.

Unemployment rate: OECD Economic Outlook.

Tax wedge: Nickell et al. (2005).

Unemployment benefit: benefit replacement rate multiplied by benefit duration, from Nickell et al. (2005).

Employment protection: Nickell et al. (2005).

Minimum Wage: Checchi and Nunziata (2007).

Real Long Term interest rate: OECD Economic Outlook.

Employment share in agriculture: OECD Economic Outlook and author's calculations.

Growth rate: OECD Economic Outlook and author's calculations.

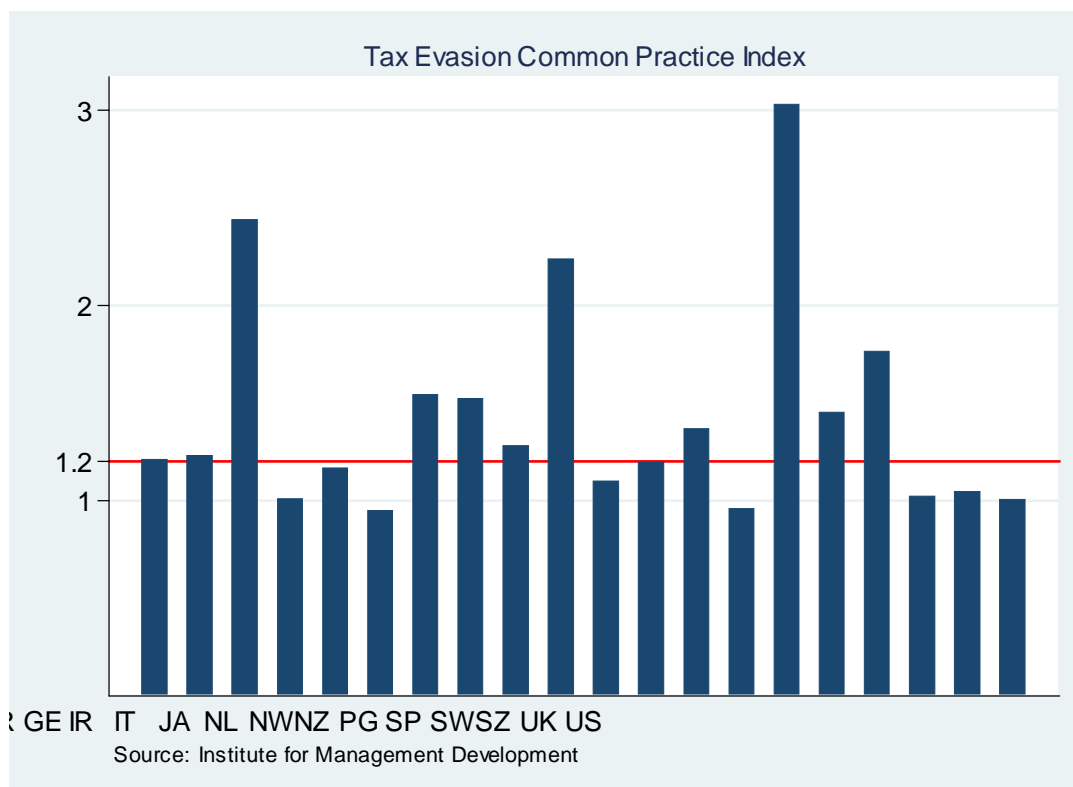
Union density: Nickell et al. (2005).

Male manual employment share in manufacturing: Checchi and Nunziata (2007).

Log oil price in \$: West Texas Intermediate.

Annual working hours: OECD Economic Outlook.

Log GDP per capita: OECD Main Economic Indicators and author's calculations.



Primary balance (% GDP): OECD Economic Outlook and author's calculations.

Government net financial liabilities (% GDP): OECD Economic Outlook and author's calculations.

Informal Economy Estimate (% GNP): World Bank, Doing Business.

Tax evasion common practice index: Institute for Management Development.

Cost of Starting a Business (%GNI percapita): World Bank, Doing Business. See also Djankov et al (2002).

