

IZA DP No. 3503

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May 2008

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Discussion Paper No. 3503
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ABSTRACT

Risk Aversion and Sorting into Public Sector Employment^{*}

This research note uses two German data sets – the large-scale German Socio-Economic Panel and unique data from own student questionnaires – to analyse the relationship between risk aversion and the choice for public sector employment. Main results are: (1) more risk averse individuals sort into public sector employment, (2) the impact of career specific and unemployment risk attitudes is larger than the impact of general risk attitudes, and (3) risk taking is rewarded with higher wages in the private but not in the public sector.

JEL Classification: J24, J31, J45

Keywords: public sector, risk aversion, sorting, wage differentials

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^{*} I thank Thomas Cornelissen and Knut Gerlach for helpful comments.

1. Introduction

Estimates of the public-private sector wage differential have received large attention in the last decades (Pedersen, Schmidt-Sorensen, Smith, and Westergard-Nielsen, 1990; Dustmann and van Soest, 1997, 1998; Gregory and Borland, 1999; Borjas, 2002). Early studies analyse the homogeneous wage differential which is mostly positive. Recently, the focus has shifted to the heterogeneity of the wage differential. One result is that workers at the lower tail of the wage distribution benefit more from public sector employment than workers at the upper tail of the wage distribution, who even earn less in the public sector according to several studies (Poterba and Rueben, 1994; Mueller, 1998; Jürges, 2002; Melly, 2005). Thus, there might be a wage penalty for highly qualified employees in the public sector. But why do these workers accept lower wages in the public sector? As the demand of private sector firms for highly qualified workers is quite large and stable over time, it is not the lack of opportunities.

A plausible explanation is that some workers have preferences to work in the public sector and self-select into public sector firms. Luechinger, Stutzer, and Winkelmann (2007) find that sector selection on unobservables is reduced after controlling for preferences towards risk taking, helping other people, having a successful career, and social and political engagement. Moreover, self-selection into public and private sector jobs is associated with a gain in happiness. If happiness is an adequate proxy for utility, these results suggest that utility does depend on pay as well as on non-monetary firm and job characteristics, which are heterogeneously weighted by workers. An important non-monetary characteristic is employment security, which is perceived larger in the public sector than in the private sector (Clark and Postel-Vinay, 2005; Luechinger, Stutzer, and Winkelmann, 2007). Therefore, higher wages in the private sector might reflect a compensating wage differential which is paid to compensate workers for lower job security. Because risk averse individuals weigh job security higher, they are more likely to sort themselves into public sector employment (Bellante and Link, 1981; Luechinger, Stutzer, and Winkelmann, 2007). In addition to the utility gain effect from self-selection, another efficiency gain is likely to occur on the labour demand side because firms can pay lower average compensating wage differentials.

Even though this line of reasoning is straightforward, little direct empirical evidence exists because most data sets do not contain measures of risk aversion and analyses are limited to already employed workers. In this paper, two German data sets are used which help to overcome these problems and contribute new findings to the literature about risk aversion and selection into public sector employment. First, I use the 2004 wave of the German Socio-Economic Panel (GSOEP) to estimate the probability of being employed in the public sector conditional on individual risk aversion. Moreover, I present estimates of earnings functions analysing the public-private sector wage gap and the impact of risk aversion. Both analyses are performed for all workers as well as for college graduates only. Second, I use unique questionnaire data which was especially designed to study compensating wage differentials and sorting into private and public sectors. The respondents are highly qualified future applicants, namely Master students in Economics and Management, who can choose between two hypothetical job offers from a public and a private sector firm.

2. Evidence from Survey Data

2.1. Data

The German Socio-Economic Panel (GSOEP) is a longitudinal survey of private households and persons in Germany. The data contains a rather stable set of core questions asked every year (e.g., education, training, qualification, income, social security, sector, housing) and yearly topics with additional detailed questions. The 2004 wave includes questions concerning individual risk taking behaviour from which the following two are used in the subsequent analysis:

“Are you generally a person who is fully prepared to take risks or do you try to avoid taking risks? (0: risk averse, 10: fully prepared to take risks)”

“People can behave differently in different situations. How would you rate your willingness to take risks in your occupational career? (0: risk averse, 10: fully prepared to take risks)”

The 2004 wave comprises information on more than 20000 individuals. However, the nature of the topic induces a reduction in sample size by more than a half, because only dependent part-time or full-time employed individuals are considered, who have the German citizenship and are aged between 18 and 65 years. Descriptive statistics will be presented together with the estimation results in the subsequent sections.

2.2. Probability of Public Sector Employment

The probability of public sector employment is estimated using a simple binary choice model – the Probit model. The dependent variable is a dummy variable which takes the value one if an individual is employed in the public sector and zero if she is employed in the private sector. In addition to the variables measuring risk aversion, several control variables are used. Schooling can take three forms: low (“Hauptschule”), medium (“Realschule”), and high school (“Fachhochschulreife/ Abitur”). Furthermore, a dummy variable indicating a college degree, age in years, a female dummy, and a dummy variable for workplace in the new federal states (former East Germany) are considered.

Table 1 reports marginal effects of the Probit estimates. About 32 percent of all workers are employed in the public sector. The first specification shows that individuals, who are one point more willing to take risks in general, are on average 0.83 percentage points less likely to work in the public sector. The second specification shows that the effect is stronger if career specific risk taking behaviour instead of general risk taking behaviour is used. The third specification includes both variables and indicates that it is in fact career risk taking and not general risk taking which drives the results because the latter is not significant anymore. This result is supported in specification four which controls for additional characteristics like schooling, college degree, age, gender, and new federal states. Higher qualified workers are more likely to be employed in the public sector. This result corresponds with previous findings (Bellante and Link, 1981; Blank, 1985; Luechinger, Stutzer, and Winkelmann, 2007) and might be reasoned by public sector demand for higher qualified employees to fulfil the required tasks (Gregory and Borland, 1999). Females are also significantly more likely to work in the public sector. The results are confirmed in the subsample of employees with college

degrees. An interesting finding is that risk taking seems to have a larger effect for highly qualified than for low qualified workers.

- Insert Table 1 about here

2.3. Public-Private Wage Gap and Risk Aversion

The following log-linear earnings functions are estimated using ordinary least squares (OLS) and the log hourly wage as dependent variable. The hourly wage is the gross monthly income plus mean gross monthly fringe benefits in Euros divided by actual monthly working hours.¹ The first specification in Table 2 shows an unconditional average public-private sector wage gap of close to 15 percent. After controlling for schooling, college degree, tenure, full-time work experience, part-time work experience, unemployment experience, age, gender, and new federal states, the public-private sector wage gap is reduced to less than 3 percent. A separate estimate for college graduates shows that highly qualified workers do not earn a wage premium in the public sector. In fact, they earn on average nearly 3 percent less than college graduates in the private sector. However, the negative coefficient of the public sector dummy is not significant because of quite large standard errors. These findings are consistent with other studies which report that workers at the lower tail of the wage distribution benefit more from public sector employment than workers at the upper tail of the wage distribution, who even earn less in the public sector (Poterba and Rueben, 1994; Mueller, 1998; Jürges, 2002; Melly, 2005).

- Insert Table 2 about here

The previous estimates are repeated with additional variables for risk taking (see Table 3). Whereas general risk taking has no significant impact on wages, more risk taking in the career by one point increases the wage by more than 1 percent. Dropping the

¹ Whereas all other variables stem from the 2004 wave, fringe benefits are used from the 2005 wave of the GSOEP because the respondents report the values retrospective for the last year. To make sure that the reported values refer to the employer at time of the interview in 2004, only respondents who did not change their employer in the entire year 2004 are considered.

insignificant general risk taking variable and including an interaction term between public sector and career risk taking reveals an interesting result. In the private sector, the rate of return per additional risk point is 1.65 percent. Because the interaction term has approximately the same size but is negative, there is no rate of return for risk taking in the public sector. The separate estimate for college graduates shows the same pattern.

- Insert Table 3 about here

The finding is plausible since risk taking in the public sector might not be a beneficial worker characteristic, whereas risk taking might be used productively in private profit-maximizing firms (e.g., financial sector). Moreover, risk takers in the private sector might sort into risky jobs (e.g., risk of injury) and receive compensating wage differentials (Hersch and Viscusi, 1990). Further, more risk tolerant workers in the private sector might have higher reservation wages and invest more in job search and, consequently, end up in higher paid jobs (Pissarides, 1974; Feinberg, 1977; Pannenberg 2007). Because human capital investments are also risky decisions, risk averse individuals invest less in human capital and, subsequently, earn lower future wages (Levhari and Weiss, 1974; Shaw, 1996). If public sector employment would really be stable, the employer rather than the employee can cover training costs and retain rents so that the correlation between risk aversion and human capital investments is not present anymore in the public sector. Overall, the results emphasize an additional source of sorting, which is not induced by preferences for employment security but by differences in returns for risk taking behaviour between public and private sector employment.

3. Evidence from Student Questionnaires

3.1. Data

Even though the results in section 2.2. show a significant correlation between risk aversion and public sector employment, they are subject to potential problems. First, public sector employment might also increase risk aversion of employees and, thus, the causal relationship is the opposite way around. Second, public and private sector

employment might not be a free individual choice but depend on labour market conditions. Third, jobs in the public sector differ also in other characteristics than employment security. To rule out these potential sources of bias, student questionnaires with hypothetical – but still realistic – choices between public and private sector employment are applied in this section.

The questionnaire data was gathered during the first lesson of the course “Introduction to Personnel Economics” at the University Duisburg-Essen, Germany, in January 2008. The respondents of the written questionnaires are third to fifth year Master students in Economics and Management. They are the ideal group to study selection processes of highly qualified workers, because the students will soon find themselves in the situation of applying for jobs with different characteristics like sector belonging. The hypothetical scenario is the following:

“After finishing your university degree you can choose between two employment offers – one from the private sector and one from the public sector. The two jobs do not differ in their tasks, whereas salaries and employment security are different. Annual earnings in the private sector are 45000 Euros. In the public sector, annual earnings are lower but you have very high employment security. Would you prefer to work in the private or public sector?”

“How much of the annual earnings in the private sector (45000) are you willing to give up for working in the public sector with high employment security?”

The questionnaires contain also a set of explanatory variables. First, I use the questions from the GSOEP for risk aversion (general risk taking, career risk taking) and a new measure of preference for employment security. Second, the students are asked for the expected final grade of their Master degree as a productivity proxy. At last, I control for the gender of the respondents. A description of the variables can be found in Table A.1 in the Appendix.

Descriptive statistics of the used sample are presented in Table 4. The respond rate of the students was about 95 percent and 86 out of 94 questionnaires without missing

values and inconsistencies in the answers could be used for the subsequent analyses. 57 percent of these respondents prefer in general to work in the public sector with high employment security and lower wages. In fact, they are willing to give up earnings to be employed in the public sector of on average 4713 Euros, ranging from 1000 Euros to 13800 Euros. The mean average risk taking behaviour has about the same size as in the college graduate sample of the GSOEP (see Table 1) and is larger for respondents who choose to work in the private rather than in the public sector. Further, employment security is on average more important for those choosing the public sector. Students who choose the private sector expect on average better grades. While 52 percent of all students are females, the share of females is 43 percent for private sector choice and 59 percent for public sector choice.

- Insert Table 4 about here

3.2. Public Sector Choice and Compensating Wage Differential

Table 5 presents marginal effects of Probit estimates for the general choice to work in the public sector. The first specification shows that respondents, who are one point more risk tolerant in general, are on average 6 percentage points less likely to choose the public sector. Specification two includes career risk taking behaviour instead of general risk taking. The effect is with 7.3 percentage points larger than the effect of general risk taking behaviour. Specification three contains the new measure for risk aversion against unemployment, which has a sizeable marginal effect of 27.5 percentage points. All three risk taking variables are combined in specification four. Even though general and career risk taking still have an effect of more than 3 percentage points, their impact is not significant anymore. The preference for employment security, however, remains highly significant even after controlling for the expected final grade and gender in specification five. The expected final grade as a proxy for productivity is highly significant and quite sizeable, which indicates that better students are more likely to choose the private over the public sector. One explanation for this finding might be that more productive individuals have better overall employment prospects and do not need to fear unemployment. Surprisingly, gender seems to have no impact on the decision of

choosing the public sector after controlling for risk aversion and productivity in the quite homogenous student sample. This finding indicates that large parts of gender differences might be due to unobservable factors which are measured by the gender variable in empirical analyses like the one presented in section 2 with the GSOEP.

- Insert Table 5 about here

Instead of the binary public sector choice, it is also possible to exploit the information of how much of the hypothetical private sector earnings of 45000 Euros per year the respondent is willing to give up to work in the public sector with high employment security. This willingness to pay can be interpreted as a compensating wage differential which has to be paid for insecure private sector employment. The 43 percent of the students who stated that they would always prefer to work in the private sector are given a zero, whereas the willingness to pay for public sector employment ranges from 1000 to 13800 Euros. The ordinary least squares (OLS) estimates in Table 6 reveal the same pattern as the previous Probit estimates. More risk averse individuals demand higher compensating wage differentials for working in the private sector which offers lower employment stability. Career and especially unemployment risk aversion is more important in determining the public sector choice than general risk taking behaviour. Better students are less willing to pay for public sector employment and gender has no significant impact.

- Insert Table 6 about here

4. Conclusion

Like predicted by theory, more risk averse workers sort into public sector employment if employment security is larger in the public than in the private sector. Moreover, the results indicate that the impact of general risk attitudes is smaller compared to career specific and especially unemployment risk attitudes. Therefore, it seems to be important to distinguish between different types of risk aversion when analysing risk aversion in different contexts. The reported wage premium in the public sector for the total sample is at odds with higher employment security and the theory of compensating wage

differentials. One explanation for this finding might be unobserved worker and workplace characteristics. Another explanation, which is supported by the data, might be that more risky behaviour is rewarded in the private but not in the public sector and, thus, more risk taking workers sort into the private sector for a different reason than only employment security.

A positive public-private wage differential in combination with higher employment security in the public sector contradicts the theory of compensating wage differentials at first glance. As this would obviously lead to an excess supply of labour to the public sector, wages could be cut down by the government. Bellante and Link (1981) interpret this finding as “overpayment” of public sector workers. The non-profit maximizing behaviour, political decisions, collective contracts, and high union density in the public sector are likely to lead to high wages. From an economic perspective taxes could be spent more efficiently (e.g., education) and a reduction in government spending could be used to reduce taxes which increases economic incentives.

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Appendix

Table A.1: Variable List of Student Questionnaires

variables	questions	coding of answers
public sector choice (dummy)	After finishing your university degree you can choose between two employment offers – one from the private sector and one from the public sector. The two jobs do not differ in their tasks, whereas salaries and employment security are different. Annual earnings in the private sector are 45000 Euros. In the public sector, annual earnings are lower but you have very high employment security. Would you prefer to work in the private or public sector?	0: private sector, 1: public sector
compensating wage differential (Euros)	How much of the annual earnings in the private sector (45000) are you willing to give up for working in the public sector with high employment security?	in Euros
general risk taking (0: low, 10: high)	Are you generally a person who is fully prepared to take risks or do you try to avoid taking risks?	0: risk averse, 10: fully prepared to take risks
career risk taking (0: low, 10: high)	People can behave differently in different situations. How would you rate your willingness to take risks in your occupational career?	0: risk averse, 10: fully prepared to take risks
importance employment security (1: high, 4: low)	How important is it for you to be secure from unemployment?	1: very important, 2: important, 3: less important, 4: not important
final grade (1: very good, 3: satisfactory)	What is your expected final degree in your studies?	1: very good, 2: good, 3: satisfactory
female (dummy)	Are you female or male?	0: male, 1: female

Tables included in Text

Table 1: Probability of Public Sector Employment

	all observations					only college graduates	
	mean (std.dev.)	(1)	(2)	(3)	(4)	(5)	mean (std.dev.)
dependent variable: public sector (dummy)	0.3219 (0.4672)						0.4835 (0.4998)
general risk taking (0: low, 10: high)	4.7842 (2.1241)	-0.0083*** (0.0024)		-0.0025 (0.0030)	0.0009 (0.0031)	-0.0041 (0.0067)	4.9702 (2.0437)
career risk taking (0: low, 10: high)	4.0632 (2.4621)		-0.0099*** (0.0021)	-0.0086*** (0.0026)	-0.0093*** (0.0027)	-0.0173*** (0.0057)	4.3941 (2.4244)
medium school degree (dummy)	0.4020 (0.4903)				0.1165*** (0.0148)		0.1593 (0.3660)
high school degree (dummy)	0.3328 (0.4712)				0.1584*** (0.0186)		0.8230 (0.3818)
college degree (dummy)	0.2750 (0.4465)				0.1452*** (0.0163)		1.0000 (0.0000)
age (years)	42.4051 (10.4206)				0.0056*** (0.0005)	0.0083*** (0.0011)	45.4444 (9.7233)
female (dummy)	0.4649 (0.4988)				0.1139*** (0.0107)	0.1880*** (0.0219)	0.4364 (0.4960)
new federal states (dummy)	0.2261 (0.4184)				-0.0119 (0.0128)	0.0377 (0.0248)	0.2722 (0.4452)
number of observations	8176	8176	8176	8176	8176	2248	2248
Pseudo R-squared		0.0011	0.0022	0.0022	0.0664	0.0523	

Note: ML-Probit marginal effects. Robust standard errors in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 2: Public-Private Sector Wage Gap

	all observations			only college graduates	
	mean (std.dev.)	(1)	(2)	(3)	mean (std.dev.)
dependent variable: log(hourly net wage in Euros)	2.7324 (0.4964)				3.0337 (0.4679)
public sector (dummy)	0.3347 (0.4719)	0.1465*** (0.0125)	0.0287*** (0.0108)	-0.0268 (0.0225)	0.4906 (0.5001)
medium school degree (dummy)	0.4125 (0.4923)		0.1178*** (0.0132)		0.1694 (0.3752)
high school degree (dummy)	0.3331 (0.4714)		0.2898*** (0.0178)		0.8150 (0.3884)
college degree (dummy)	0.2850 (0.4515)		0.2337*** (0.0167)		1.0000 (0.0000)
tenure (years)	12.3435 (9.9030)		0.0173*** (0.0018)	0.0152*** (0.0044)	13.4932 (10.2312)
tenure squared / 100	2.5041 (3.4870)		-0.0260*** (0.0050)	-0.0293*** (0.0112)	2.8668 (3.6602)
experience full-time work (years)	17.0050 (10.6843)		0.0130*** (0.0029)	0.0147** (0.0063)	17.7020 (10.5600)
experience full-time work squared / 100	4.0330 (4.1435)		-0.0268*** (0.0063)	-0.0597*** (0.0139)	4.2480 (4.0541)
experience part-time work (years)	2.5746 (5.3401)		-0.0073** (0.0035)	-0.0160** (0.0071)	2.2718 (4.6686)
experience part-time work squared / 100	0.3514 (1.1768)		0.0143 (0.0128)	0.0325 (0.0337)	0.2694 (0.8928)
experience unemployment (years)	0.3426 (0.9867)		-0.0711*** (0.0081)	-0.1558*** (0.0334)	0.2037 (0.6417)
experience unemployment / 100	0.0109 (0.0989)		0.3403*** (0.0620)	1.4865** (0.6454)	0.0045 (0.0297)
age (years)	43.0091		0.0354***	0.0271*	45.8363

	(9.7928)		(0.0059)	(0.0140)	(9.2237)
age squared / 100	19.4566		-0.0367***	-0.0152	21.8599
	(8.3876)		(0.0066)	(0.0153)	(8.3978)
female (dummy)	0.4564		-0.1673***	-0.2173***	0.4288
	(0.4981)		(0.0120)	(0.0232)	(0.4951)
new federal states (dummy)	0.2303		-0.3454***	-0.2782***	0.2888
	(0.4211)		(0.0129)	(0.0235)	(0.4533)
constant		2.6833***	1.6318***	2.2323***	
		(0.0088)	(0.1092)	(0.2836)	
number of observations	5614	5614	5614	1600	1600
R-squared		0.0194	0.4321	0.2852	

Note: OLS coefficients. Robust standard errors in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 3: Risk Aversion and Wages

	all observations			only college graduates	
	mean (std.dev.)	(1)	(2)	(3)	mean (std.dev.)
dependent variable: log(hourly net wage in Euros)	2.7324 (0.4964)				3.0337 (0.4679)
public sector (dummy)	0.3347 (0.4719)	0.0310*** [0.0108]	0.0988*** [0.0198]	0.0565 [0.0443]	0.4906 (0.5001)
general risk taking (0: low, 10: high)	4.7956 (2.1054)	-0.0004 [0.0029]			4.9813 (2.0276)
career risk taking (0: low, 10: high)	4.0385 (2.4272)	0.0109*** [0.0026]	0.0165*** [0.0029]	0.0220*** [0.0075]	4.3444 (2.3978)
public sector * career risk taking	1.2852 (2.2909)		-0.0172*** [0.0043]	-0.0184** [0.0092]	1.9763 (2.6289)
control variables (see Table 2)		Yes	Yes	Yes	
number of observations	5614	5614	5614	1600	1600
R-squared		0.4347	0.4362	0.2913	

Note: OLS coefficients. Robust standard errors in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 4: Descriptive Statistics Student Questionnaires

	all observations				private sector choice				public sector choice			
	mean	std.dev.	min.	max.	mean	std.dev.	min.	max.	mean	std.dev.	min.	max.
public sector choice (dummy)	0.57	0.50	0	1	0.00	0.00	0	0	1.00	0.00	1	1
compensating wage differential (Euros)	2685.47	3016.12	0	13800	0.00	0.00	0	0	4713.27	2520.43	1000	13800
general risk taking (0: low, 10: high)	4.97	1.88	0	9	5.43	1.68	2	9	4.61	1.96	0	9
career risk taking (0: low, 10: high)	4.73	1.97	0	8	5.35	1.78	1	8	4.27	2.00	0	8
importance employment security (1: high, 4: low)	1.77	0.76	1	4	2.11	0.81	1	4	1.51	0.62	1	4
final grade (1: very good, 3: satisfactory)	2.14	0.49	1	3	1.95	0.47	1	3	2.29	0.46	2	3
female (dummy)	0.52	0.50	0	1	0.43	0.50	0	1	0.59	0.50	0	1

Note: Numbers of observations are 86 for the total sample, 37 for private sector choice, and 49 for public sector choice.

Table 5: Probability of Public Sector Choice

	(1)	(2)	(3)	(4)	(5)
general risk taking (0: low, 10: high)	-0.0600** (0.0297)			-0.0323 (0.0342)	-0.0064 (0.0357)
career risk taking (0: low, 10: high)		-0.0732** (0.0292)		-0.0348 (0.0360)	-0.0485 (0.0365)
importance employment security (1: high, 4: low)			-0.2746*** (0.0888)	-0.2454*** (0.0866)	-0.2910*** (0.0873)
final grade (1: very good, 3: satisfactory)					0.4843*** (0.1527)
female (dummy)					0.011 (0.1383)
number of observations	86	86	86	86	86
Pseudo R-squared	0.0357	0.0572	0.1161	0.1446	0.2436

Note: ML-Probit marginal effects. Robust standard errors in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 6: Compensating Wage Differential

	(1)	(2)	(3)	(4)	(5)
general risk taking (0: low, 10: high)	-378.2046*** (143.0093)			-192.7835 (150.5624)	-76.3005 (158.2197)
career risk taking (0: low, 10: high)		-397.7173** (172.3240)		-132.5639 (188.2462)	-177.8691 (194.0867)
importance employment security (1: high, 4: low)			-1539.8680*** (324.1480)	-1319.8583*** (318.6840)	-1212.2820*** (364.7935)
final grade (1: very good, 3: satisfactory)					1575.6259*** (573.0349)
female (dummy)					140.3538 (681.5369)
constant	4563.2951*** (869.9367)	4567.6853*** (936.9120)	5407.0924*** (757.8030)	6602.7969*** (1041.4243)	2604.17 (1844.8037)
number of observations	86	86	86	86	86
R-squared	0.0553	0.0677	0.1513	0.1805	0.2405

Note: OLS coefficients. Robust standard errors in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%.