Who Wants Wage Moderation? Trade Exposure, Export-Led Growth, and the Irrelevance of Bargaining Structure

Lucio Baccaro and Erik Neimanns, Max Planck Institute for the Study of Societies, Germany

Online Appendices

Contents

Appendix A.1: Cross-validation of our measure of wage dissatisfaction

Appendix A.2: Operationalization of our measure of the import-adjusted contribution of exports to GDP growth

Table A.1: Average values of export orientation and wage dissatisfaction

Table A.2: Summary statistics of the measure of occupational trade exposure by ISCO88 1-digit occupational categories

Table A.3: Variable operationalization

Table A.4: Multilevel logistic random intercept regressions: Determinants of wage dissatisfaction using Blinder’s (2009) offshorability index

Table A.5: Multilevel logistic random intercept regressions: Determinants of wage dissatisfaction; effects of macro-level covariates

Table A.6: Multilevel logistic random intercept regressions: Determinants of wage dissatisfaction; effects of wage bargaining centralization and union centralization

Table A.7: Multilevel logistic random intercept regressions: Determinants of wage dissatisfaction; effects of wage bargaining structures and export-led growth

Table A.8: Multilevel ordered logistic random intercept regressions: Determinants of wage dissatisfaction

Table A.9: Multilevel logistic random intercept regressions: Determinants of wage dissatisfaction; alternative specifications of export-led growth

Table A.10: Multilevel logistic random intercept regressions: Determinants of wage dissatisfaction; accounting for sectoral wage differentials

Figure A.1: Export-led growth, sectoral wage differentials, and wage dissatisfaction; country averages

Figure A.2: Average marginal effects of occupational trade exposure on wage dissatisfaction (left panel) and predicted probabilities of wage dissatisfaction (right panel), by sectoral wage differentials (levels) and occupational trade exposure

Figure A.3: Average marginal effects of occupational trade exposure on wage dissatisfaction (left panel) and predicted probabilities of wage dissatisfaction (right panel), by sectoral wage differentials (changes) and occupational trade exposure

Table A.11: Multilevel logistic random intercept regressions: Determinants of wage dissatisfaction; including an interaction between levels and changes of export-led growth

Table A.12: Multilevel logistic random intercept regressions: Determinants of wage dissatisfaction; including random intercepts only at the country-year level
Appendix A.1: Cross-validation of our measure of wage dissatisfaction

We cross-validated the suitability of our proxy measure of wage dissatisfaction by examining how different items on attitudes towards wages relate to each other, using the WageIndicator Survey (Tijdens et al. 2010).

The WageIndicator Survey is a non-representative survey covering a range of items on preferences towards working conditions and wages. For this comparison, we only use the waves from 2003 and 2004 for the Netherlands due to data availability. Unfortunately, this survey does not replicate exactly the item from the ISSP, but it contains items on whether the “wage is sufficient for my job”, on “satisfaction with pay”, and whether one “should earn more given performance”. Bivariate correlations (see table below) show a strong positive correlation (r=0.73) between the variables “wage is sufficient for my job” and “satisfaction with pay”. A low “satisfaction with pay”, in turn, is closely associated with the perception that one "should earn more given performance". The correlation coefficient is r=-0.55. In brief, different operationalizations of wage satisfaction are correlated with each other in the WageIndicator Survey. This cross-validation increases our confidence in our measure of wage dissatisfaction from the ISSP.

Correlations across items on wage dissatisfaction in the WageIndicator survey

| Wage is sufficient for my job (0: No; 1: Yes) | Should earn more given performance (1: Fully disagree; 5: Fully agree) |
|---------------------------------------------|-------------------------------------------------|
| Satisfaction with pay (0: No; 1: Yes)       | 0.7247                                           |
|                                              | 0.00                                             |
|                                              | 3824                                             |
| Satisfaction with pay (1: Highly dissatisfied; 5: Highly satisfied) | -0.5501                                          |
|                                              | 0.00                                             |
|                                              | 2735                                             |

Note: Data is from the Netherlands for the years 2003 and 2004; cells display bivariate correlation coefficients, levels of significance, and number of observations. The variables “wage is sufficient for my job” and “should earn more given performance” were measured in different waves. The measurement scales for the “satisfaction with pay” variable varied between these waves (0-1 between December 2003 and April 2004; 1-5 between October and December 2004).

Source: Tijdens et al. (2010)
Appendix A.2: Operationalization of our measure of the import-adjusted contribution of exports to GDP growth

In the following, we describe in more detail how we arrive at our measure of the import-adjusted contribution of exports to GDP growth. We begin with the standard GDP (Y) accounting identity:

$$Y = C + I + G + E - I$$

For simplicity, we group the demand components related to domestic demand

$$D = C + I + G$$

Thus

$$Y = D + E - I$$

The growth contributions of domestic and foreign demand is generally calculated as follows:

$$\frac{Y_t - Y_{t-1}}{Y_t} = \frac{D_t - D_{t-1}}{Y_{t-1}} + \frac{(E_t - I_t) - (E_{t-1} - I_{t-1})}{(E_{t-1} - I_{t-1})} \times \frac{(E_{t-1} - I_{t-1})}{Y_{t-1}}$$

This is the approach used by Baccaro and Pontusson (2016). The problem with this approach is that by subtracting imports solely from exports, it leads to underestimation of the contribution of exports to growth, and conversely to overestimation of the contribution of domestic demand components. In fact, some imports are used for consumption purposes; others for investment purposes; still others for government consumption. Only a portion of imports are incorporated into exports. A correct evaluation of growth components should divide imports into domestically-consumed imports (ID) and imports used for exports (IE). In symbols:

$$I = ID + IE$$

From this it follows:

$$Y = (D - ID) + (E - IE).$$

The growth contribution of import-adjusted domestic and foreign demand is as follows:

$$\frac{Y_t - Y_{t-1}}{Y_t} = \frac{(D_t - ID_t) - (D_{t-1} - ID_{t-1})}{(D_{t-1} - ID_{t-1})} \times \frac{(D_{t-1} - ID_{t-1})}{Y_{t-1}} + \frac{(E_t - IE_t) - (E_{t-1} - IE_{t-1})}{(E_{t-1} - IE_{t-1})} \times \frac{(E_{t-1} - IE_{t-1})}{Y_{t-1}}$$
National Accounts data do not provide a breakdown of imports by demand component. However, the OECD provides estimates of the import-intensity of exports based on Input-Output tables. We use these OECD estimates to calculate the quantity of imports that is used by exports (IE), according to the following identity:

$$\frac{IE}{E} = \frac{IE}{E} \times \frac{E}{I} \times I$$

$$\frac{IE}{E}$$ is obtained from the OECD online database; $$\frac{E}{I}$$ is the ratio of exports to input, and $$I$$ is the quantity of imports. E and I are from Ameco (2019).

We use the following formula to arrive at our final measure of the import-adjusted contribution of exports to GDP growth, in short, export-led growth. In the formula, we distinguish between prices and quantities:

$$\frac{P^e}{P} \frac{I_E - P^e_{t-1}I_{E_{t-1}}}{P_{t-1}Y_{t-1}} \times \frac{P^e_{t-1}I_{E_{t-1}}}{P_{t-1}Y_{t-1}} \times \frac{1}{P^e_{t-1}I_{E_{t-1}} - P_{t-1}Y_{t-1}} = \frac{P^e}{P} \frac{I_E}{P_{t-1}Y_{t-1}}$$

Where $$P^e$$ is the price of exports, $$P$$ is the price of GDP, IE is import-adjusted exports, and Y is GDP.

According to the formula, (import-adjusted) export-led growth increases if export quantities grow faster than output quantities, but also if export prices grow faster than output prices (which would indicate upgrading of exports).

The above measure of import-adjusted export-led growth weighs the absolute growth contribution of exports by total growth. In robustness check, we consider the impact of the absolute growth contribution of exports only (see appendix Table A9).

To avoid an excessive influence of year-to-year fluctuations in exports in our estimations, we calculate 5-year averages for the periods preceding data collection in the ISSP (i.e. 1994-1998 and 2004-2008).

---

1 These OECD estimates are based on the following formula as reported by the OECD website: Imports content of exports = $$u A_m (I - A_d)^{-1} EX / \Sigma EX$$, where: $$A_m$$ and $$A_d$$ are the input-output coefficient matrices for imported and domestic transactions, respectively; $$I$$ is the identity matrix; $$(I - A_d)^{-1}$$ is the Leontief inverse matrix; $$u$$ denotes an 1 x n vector each of whose components is 1 for corresponding import types; and $$EX$$ is the export vector.
### Table A.1: Average values of export orientation and wage dissatisfaction

| Country        | Import-adjusted contribution of exports to GDP growth | Wage dissatisfaction |
|----------------|------------------------------------------------------|----------------------|
|                | 1994-1998   | 2004-2008 | 1999 | 2009 |
| Australia      | 0.14        | 0.47      | 0.46 | 0.61 |
| Austria        | 0.65        | 0.70      | 0.45 | 0.43 |
| Belgium        | 0.79        | 0.94      | .    | 0.40 |
| Denmark        | 0.26        | 0.43      | 0.53 | 0.50 |
| Finland        | 0.39        | 0.34      | .    | 0.64 |
| France         | 0.50        | 0.24      | 0.60 | 0.69 |
| Germany        | 0.77        | 0.71      | 0.54 | 0.53 |
| Iceland        | 0.39        | 0.63      | .    | 0.53 |
| Italy          | 0.27        | 0.29      | .    | 0.67 |
| Japan          | 0.27        | 0.41      | .    | 0.66 |
| Korea          | 0.73        | 0.59      | .    | 0.52 |
| New Zealand    | 0.21        | 0.42      | 0.55 | 0.52 |
| Norway         | 0.36        | 0.53      | 0.61 | 0.55 |
| Portugal       | 0.39        | 0.29      | 0.80 | 0.67 |
| Spain          | 0.55        | 0.17      | 0.62 | 0.63 |
| Sweden         | 0.44        | 0.48      | 0.75 | 0.69 |
| Switzerland    | 1.00        | 0.74      | .    | 0.35 |
| United Kingdom | 0.22        | 0.46      | 0.61 | 0.52 |
| United States  | 0.11        | 0.24      | 0.62 | 0.56 |
| Mean           | 0.45        | 0.48      | 0.60 | 0.56 |
| Standard deviation | 0.25    | 0.20      | 0.31 | 0.10 |
Table A.2: Summary statistics of the measure of occupational trade exposure by ISCO88 1-digit occupational categories

| ISCO88 1 digit-level                                      | Occupational trade exposure |
|----------------------------------------------------------|----------------------------|
|                                                           | N  | mean | SD  | min | max |
| 1000 Legislators, senior officials & managers             | 1,300 | 0.07 | 0.19 | 0   | 1.36 |
| 2000 Professionals                                         | 2,689 | 0.02 | 0.05 | 0   | 0.55 |
| 3000 Technicians and associated professionals             | 2,975 | 0.04 | 0.13 | 0   | 2.47 |
| 4000 Clerks                                               | 1,918 | 0.02 | 0.04 | 0   | 0.44 |
| 5000 Service workers & shop & market sales workers        | 2,067 | 0    | 0    | 0   | 0.04 |
| 6000 Skilled agricultural & fishery workers               | 142  | 0.24 | 0.1  | 0.07| 0.49 |
| 7000 Craft etc trades workers                              | 1,470 | 0.22 | 0.31 | 0   | 4.75 |
| 8000 Plant & machine operators & assemblers               | 868  | 0.33 | 0.37 | 0   | 1.48 |
| 9000 Elementary occupations                               | 853  | 0.06 | 0.13 | 0   | 0.63 |
Table A.3: Variable operationalization

| Variable operationalization                                      | Definition                                                                                                                                                                                                 | Source                                      |
|-----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|
| Public sector worker                                            | Do you work at present or did you work in your last job in the private or public sector? 1: working for the government or a publicly owned firm/nationalized industry; 0: working for the private sector | ISSP 1999, 2009                            |
| Occupational trade exposure (log)                               | Logarithm of trade exposure at the occupational level; derived from the likelihood of an occupation to pertain to a specific sector multiplied by sectoral trade exposure                                            | ISSP 1999, 2009; ESS 2008; OECD STAN 2019  |
| Occupational trade exposure (categorical coding)               | 1: Public sheltered, 2: Private sheltered, 3: Exposed; exposed workers are those with above-median occupational trade exposure; private sheltered workers are those with below-median occupational trade exposure who work in the private sector; public sheltered workers are those with below-median occupational trade exposure who work in the public sector; public sector includes working for the government or a publicly owned firm/nationalized industry. | ISSP 1999, 2009; ESS 2008; OECD STAN 2019  |
| Union membership                                                | Trade (labour) union membership; 1 "Currently member", 0 "Once member, not now" or "Never member".                                                                                                          | ISSP 1999, 2009                            |
| Individual income                                               | Respondent's earnings: Recoded in 10 categories                                                                                                                                                           | ISSP 1999, 2009                            |
| Part-time work                                                  | Current employment status: 1 "Employed-part time, main job" or "Employed, less than part-time"; 0 "Employed-full time, main job"                                                                            | ISSP 1999, 2009                            |
| Educational attainment                                          | Highest education level: 1 below upper secondary education; 2 upper secondary education; 3 above upper secondary education; 4 tertiary education                                                                 | ISSP 1999, 2009                            |
| Age                                                             | Age of Respondent                                                                                                                                                                                          | ISSP 1999, 2009                            |
| Age squared                                                     | Age of Respondent (squared)                                                                                                                                                                                | ISSP 1999, 2009                            |
| Female gender                                                   | Sex of Respondent: 0 male; 1 female                                                                                                                                                                         | ISSP 1999, 2009                            |
| Export-contribution to growth                                   | Import-adjusted contribution of exports to GDP growth; 5-year averages for                                                                                                                                 | AMECO (2019), OECD                         |
| Category                              | Description                                                                 | Source                                      | Notes                                                                 |
|---------------------------------------|-----------------------------------------------------------------------------|---------------------------------------------|----------------------------------------------------------------------|
| Wage bargaining coordination          | Coordination of wage setting (coord); 1 Fragmented wage bargaining, confined largely to individual firms or plants; 5 Maximum or minimum wage rates/increases based on centralized bargaining; 5-year averages for the periods preceding data collection in the ISSP |
| Level of wage bargaining              | Predominant level of wage bargaining (level)                                | ICTWSS, Visser (2019)                      |
| Union centralization                  | Centralization of wage bargaining (cent)                                    | ICTWSS, Visser (2019)                      |
| Real average wage levels              | Average annual wages per full-time equivalent dependent employee; 5-year averages for the periods preceding data collection in the ISSP | OECD (2019) Employment outlook             |
| Changes in real average wages         | Average annual wages per full-time equivalent dependent employee; change over 5 years preceding data collection in the ISSP: 1998-1994 and 2008-2004 | OECD (2019) Employment outlook             |
| GDP growth                            | Growth of real GDP, percent change from previous year; 5-year averages for the periods preceding data collection in the ISSP | CPDS I, Armingeon et al. (2014)             |
| Unemployment rate                     | Unemployment rate as a percentage of civilian labour force; 5-year averages for the periods preceding data collection in the ISSP | CPDS I, Armingeon et al. (2014)             |
| Inflation                             | Growth of consumer price index (CPI), all items, percent change from previous year; 5-year averages for the periods preceding data collection in the ISSP | CPDS I, Armingeon et al. (2014)             |
| EMU membership                        | 0 no EMU member; 1 EMU member                                               |                                             |
| Education-specific unemployment rate  | Unemployment rates of people according to their education levels: below upper secondary, upper secondary non-tertiary, or tertiary; 5-year averages for the periods preceding data collection in the ISSP | OECD (2019) Unemployment rates by education level |
| Disposable income inequality          | Estimate of Gini index of inequality in equivalized (square root scale) household disposable (post-tax, post-transfer) income; 5-year averages for the periods preceding data collection in the ISSP | SWIID, Solt (2016)                          |
| Market income inequality              | Estimate of Gini index of inequality in equivalized (square root scale) household | SWIID, Solt (2016)                          |
| Indicator                       | Description                                                                                                                                                                                                 | Source                                                                 |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|
| Offshorability index           | Occupational offshorability indicating the potential of a job to be moved abroad with little or no decline in quality; ordinal measure ranging from 1: highly non-offshorable to 4: highly offshorable; transformed into a binary measure indicating 1 for a potentially offshorable job and 0 otherwise, following Walter (2017) | Blinder (2009); Walter (2017)                                        |
| Welfare state generosity       | Total welfare state benefit generosity; based on benefit generosity of unemployment insurance, sick pay insurance, and public pensions; values for 1998 and 2008; missing data for Iceland and Korea | Comparative Welfare Entitlements Dataset, Scruggs et al. (2017)         |
| Unemployment benefit generosity| Unemployment benefit generosity; values for 1998 and 2008; missing data for Iceland                                                                                                                                 | Comparative Welfare Entitlements Dataset, Scruggs et al. (2017)         |
| Sectoral wage differentials    | Nominal compensation per employee in manufacturing divided by nominal compensation per employee in services; values for 1998 and 2008; missing data for Iceland and Switzerland                                                                 | AMECO (2019)                                                          |
Table A.4: Multilevel logistic random intercept regressions: Determinants of wage dissatisfaction using Blinder’s (2009) offshorability index; maximum likelihood estimates

| VARIABLES                  | M1      | M2      |
|----------------------------|---------|---------|
| Dependent variable: Wage dissatisfaction |          |         |
| Offshorability             | -0.199*** | -0.207*** |
|                            | (0.039)   | (0.038)   |
| Age                        | 0.067***  | 0.067***  |
|                            | (0.009)   | (0.009)   |
| Age squared                | -0.001*** | -0.001*** |
|                            | (0.000)   | (0.000)   |
| Female                     | 0.118**   | 0.139***  |
|                            | (0.037)   | (0.036)   |
| Public sector              | 0.079*    |          |
|                            | (0.039)   |         |
| Union member               | 0.190***  | 0.205***  |
|                            | (0.041)   | (0.039)   |
| Individual income          | -0.249*** | -0.246*** |
|                            | (0.010)   | (0.010)   |
| Employed part-time         | -0.620*** | -0.603*** |
|                            | (0.051)   | (0.050)   |
| Education: Upper secondary | -0.135**  | -0.119*   |
| (Reference group: Below upper sec.) | (0.050) | (0.049) |
| Above upper secondary      | -0.035    | -0.024    |
|                            | (0.055)   | (0.053)   |
| Tertiary                   | -0.045    | -0.030    |
|                            | (0.051)   | (0.050)   |
|                                |       |       |
|                                | 0.217 | 0.213 |
| Year=2009                      |       |       |
| (Reference: 1999)              | (0.133)| (0.129)|
| Random intercept variance (country) | 0.072 | 0.077 | (0.058)  | (0.058) |
| Random intercept variance (country-year) | 0.111*| 0.104*| (0.049)  | (0.046) |
| Constant                       | 0.257 | 0.233 | (0.222)  | (0.218) |
| Observations                   | 16,526| 17,031|
| N countries                    | 19    | 19    |
| N country-years                | 31    | 31    |
| Standard errors in parentheses | *** p<0.001, ** p<0.01, * p<0.05 |
### Table A.5: Multilevel logistic random intercept regressions: Determinants of wage dissatisfaction; effects of macro-level covariates; maximum likelihood estimates

| VARIABLES                                      | M1     | M2     | M3     | M4     | M5     | M6     | M7     | M8     | M9     | M10    | M11    |
|------------------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Age                                            | 0.063*** | 0.063*** | 0.064*** | 0.063*** | 0.064*** | 0.063*** | 0.065*** | 0.064*** | 0.064*** | 0.055*** | 0.057*** |
| Age squared                                     | -0.001*** | -0.001*** | -0.001*** | -0.001*** | -0.001*** | -0.001*** | -0.001*** | -0.001*** | -0.001*** | -0.001*** | -0.001*** |
| Female                                         | 0.103**  | 0.102**  | 0.102**  | 0.101**  | 0.101**  | 0.093*   | 0.102**  | 0.101**  | 0.094*   | 0.085*   | 0.092*   |
| Occupation exposure: Public sheltered (Reference group: Exposed) | 0.291*** | 0.292*** | 0.292*** | 0.291*** | 0.292*** | 0.277*** | 0.292*** | 0.292*** | 0.269*** | 0.279*** |
| Union member                                    | 0.198*** | 0.197*** | 0.197*** | 0.196*** | 0.193*** | 0.199*** | 0.151**  | 0.196*** | 0.192*** | 0.189*** |
| Individual income                               | -0.247*** | -0.249*** | -0.249*** | -0.249*** | -0.249*** | -0.245*** | -0.249*** | -0.249*** | -0.254*** | -0.248*** |
| Employed part-time                              | -0.614*** | -0.617*** | -0.618*** | -0.617*** | -0.616*** | -0.582*** | -0.618*** | -0.618*** | -0.591*** | -0.610*** |
| Education: Upper secondary (Reference group: Below upper sec.) | -0.192*** | -0.191*** | -0.190*** | -0.189*** | -0.188*** | -0.185*** | -0.079  | -0.191*** | -0.188*** | -0.209*** | -0.192*** |
| Above upper secondary                           | -0.095  | -0.093  | -0.092  | -0.091  | -0.090  | 0.066    | -0.093  | -0.089  | -0.085  | -0.094  |         |
| Tertiary                                       | 0.054   | 0.054   | 0.054   | 0.054   | 0.054   | 0.054    | 0.103   | 0.054   | 0.054   | 0.056   | 0.055   |
| Year=2009                                       | 0.433   | 0.342*  | 0.493** | 0.153   | 0.266*  | 0.306*   | 0.210   | 0.254   | 0.232   | 0.308*  | 0.280*  |
| Export-led growth (mean)                        | -1.073*** | -1.334*** | -1.589*** | -1.228*** | -1.441*** | -1.470*** | -1.201*** | -1.341*** | -1.187*** | -1.484*** | -1.283*** |
| Measure                                | Mean       | Mean Coefficient | Mean Coefficient Standard Error | Delta       | Delta Coefficient | Delta Coefficient Standard Error |
|----------------------------------------|------------|------------------|---------------------------------|-------------|-------------------|-----------------------------------|
| Export-led growth (delta)              | 0.123 (0.685) | -0.155 (0.628)  | 0.069 (0.588)                   | 0.033 (0.617) | -0.488 (0.649)    | -0.219 (0.640)                    |
| Real average wage levels (mean)        | -0.000** (0.000) | -0.000 (0.000)   | 0.312 (1.960)                   |             |                   |                                   |
| Real average wage levels (delta)       | -0.000 (0.000)   | 0.243 (0.139)   |                                 |             |                   |                                   |
| Changes in real average wages (mean)   | 0.312 (1.960)   | -0.068 (0.074)  |                                 |             |                   |                                   |
| Changes in real average wages (delta)  | 2.588 (2.592)    |                   |                                 |             |                   |                                   |
| GDP growth (mean)                      | -0.068 (0.074)  | 0.243 (0.139)   |                                 |             |                   |                                   |
| GDP growth (delta)                     |             | 0.027 (0.022)   |                                 |             | -0.071 (0.045)    |                                   |
| Unemployment rate (mean)               | 0.027 (0.022)   |                   |                                 |             |                   |                                   |
| Unemployment rate (delta)              | -0.071 (0.045)  |                   |                                 |             |                   |                                   |
| Inflation (mean)                       |             | 0.158 (0.131)   |                                 |             |                   |                                   |
| Inflation (delta)                      |             | -0.041 (0.078)  |                                 |             |                   |                                   |
| EMU membership                         |             | 0.170 (0.132)   |                                 |             |                   |                                   |
| Education-specific unemployment rate   |             | 0.026 (0.016)   |                                 |             |                   |                                   |
| (mean)                                 |             |                   |                                 |             |                   |                                   |
| Education-specific unemployment rate   |             | -0.032          |                                 |             |                   |                                   |
| (delta)                                |             |                   |                                 |             |                   |                                   |
|                                | Mean           | Delta         | Mean           | Delta         |
|--------------------------------|----------------|---------------|----------------|---------------|
| Disposable income inequality   | 0.058          | 0.003         | 0.077          | 0.025         |
| Market income inequality       | 0.077          | 0.003         | 0.077          | 0.025         |
| Welfare state generosity       | 0.008          | -0.062        | 0.008          | -0.062        |
| Unemployment benefit generosity| -0.011         | -0.079        | -0.011         | -0.079        |
| Constant                       | 1.613***       | 0.097*        | 0.079***       | 0.105*        |
| Random intercept variance (country) | 0.000 (0.000) | 0.027 (0.032) | 0.089* (0.023) | 0.104* (0.040) |
| Random intercept variance (country-year) | 0.097* (0.040) | 0.076* (0.034) | 0.087* (0.037) | 0.112* (0.038) |

N: 14,945, 14,945, 14,945, 14,945, 14,945, 14,945, 12,615, 14,945, 14,945, 13,916, 14,463
N countries: 19, 19, 19, 19, 19, 19, 16, 19, 19, 17, 18
N country-years: 31, 31, 31, 31, 31, 31, 26, 31, 31, 29, 30

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05
Table A.6: Multilevel logistic random intercept regressions: Determinants of wage dissatisfaction; effects of wage bargaining centralization and union centralization; maximum likelihood estimates

|                              | M1  | M2  | M3  | M4  | M5  | M6  | M7  | M8  |
|------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| Occupational exposure: Public sheltered (Reference group: Exposed) | 0.292*** | 0.293*** | 0.211 | 0.291*** | 0.279*** | 0.282*** | 0.105 | 0.279*** |
|                             | (0.047) | (0.047) | (0.136) | (0.047) | (0.048) | (0.048) | (0.091) | (0.048) |
| Private sheltered           | 0.101* | 0.100* | 0.069 | 0.101* | 0.093* | 0.092* | 0.095 | 0.095* |
|                             | (0.045) | (0.045) | (0.116) | (0.045) | (0.045) | (0.045) | (0.084) | (0.045) |
| Union member                | 0.198*** | 0.077 | 0.199*** | 0.197*** | 0.193*** | 0.065 | 0.196*** | 0.189*** |
|                             | (0.043) | (0.118) | (0.043) | (0.043) | (0.043) | (0.081) | (0.043) | (0.043) |
| Age                         | 0.064*** | 0.064*** | 0.064*** | 0.064*** | 0.057*** | 0.057*** | 0.058*** | 0.057*** |
|                             | (0.010) | (0.010) | (0.010) | (0.010) | (0.010) | (0.010) | (0.010) | (0.010) |
| Age squared                 | 0.001*** | 0.001*** | 0.001*** | 0.001*** | 0.001*** | 0.001*** | 0.001*** | 0.001*** |
|                             | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Female                      | 0.102** | 0.101** | 0.102** | 0.102** | 0.085* | 0.085* | 0.084* | 0.086* |
|                             | (0.039) | (0.039) | (0.039) | (0.039) | (0.039) | (0.039) | (0.039) | (0.039) |
| Individual income           | 0.250*** | 0.249*** | 0.249*** | 0.249*** | 0.249*** | 0.248*** | 0.248*** | 0.248*** |
|                             | (0.010) | (0.010) | (0.010) | (0.010) | (0.010) | (0.010) | (0.010) | (0.010) |
| Employed part-time          | 0.620*** | 0.619*** | 0.619*** | 0.618*** | 0.613*** | 0.610*** | 0.609*** | 0.611*** |
|                             | (0.053) | (0.053) | (0.053) | (0.053) | (0.054) | (0.054) | (0.054) | (0.054) |
| Education: Upper secondary  | 0.183*** | 0.183*** | 0.184*** | 0.184*** | 0.186*** | 0.184*** | 0.188*** | 0.187*** |
| (Reference group: Below upper sec.) | (0.053) | (0.053) | (0.053) | (0.053) | (0.053) | (0.053) | (0.053) | (0.053) |
| Above upper secondary       | -0.060 | -0.059 | -0.061 | -0.060 | -0.062 | -0.061 | -0.067 | -0.063 |
|                             | (0.057) | (0.057) | (0.057) | (0.057) | (0.058) | (0.058) | (0.058) | (0.058) |
| Tertiary                    | -0.083 | -0.083 | -0.084 | -0.085 | -0.086 | -0.085 | -0.087 | -0.089 |
| Year=2009       | (Reference: 1999) | Level of wage bargaining (mean) | Level of wage bargaining (delta) | Union member * Level of wage bargaining (mean) | Public sheltered * Level of wage bargaining (mean) | Private sheltered * Level of wage bargaining (mean) | Changes in real average wages (mean) | Changes in real average wages (delta) | Level of wage bargaining (mean) * Changes in real average wages (mean) | Union centralization (mean) | Union centralization (delta) | Union member * Union centralization (mean) | Public sheltered * Union centralization (mean) | Private sheltered * Union centralization (mean) |
|----------------|-------------------|--------------------------------|---------------------------------|-----------------------------------------------|--------------------------------------------------|--------------------------------------------------|-------------------------------------|-------------------------------------|---------------------------------------------|--------------------------------|-----------------------------|-----------------------------------------------|-----------------------------------------------|-----------------------------------------------|
|                |                   |                                |                                 |                                               |                                                  |                                                  |                      |                                    |                                              |                                |                |                                             |                                      |                                               |
| 0.234          | 0.235             | 0.329*                         | 0.266                           | 0.269                                         | 0.270                                           | 0.324*                                           | -0.067                             | -0.083                             | -0.077                                      | -0.329                      | (0.079)        | (0.081)                                      | (0.170)                                        | (0.391)                                      | (0.390)                                      | (0.367)                                      |
| 0.042          | 0.042             | 0.173                          | 0.045                           | (0.041)                                       |                                                 |                                                  |                      |                                    |                                              |                                |                |                                             |                                      |                                               |
| 0.042          | 0.038             | 0.042                          | 0.173                           | 0.045                                         | (0.041)                                         |                                                  |                      |                                    |                                              |                                |                |                                             |                                      |                                               |
|                |                   |                                |                                 |                                               |                                                  |                                                  |                      |                                    |                                              |                                |                |                                             |                                      |                                               |
| -14.319        | -16.122*          | (9.824)                        | (8.192)                         | -14.319                                      | -16.122*                                        |                                                  |                      |                                    |                                              |                                |                |                                             |                                      |                                               |
| 3.330          | 2.961             | (2.954)                        | (3.553)                         | 3.330                                        | 2.961                                           |                                                  |                      |                                    |                                              |                                |                |                                             |                                      |                                               |
| 5.097          |                   |                                |                                 |                                               |                                                  |                                                  |                      |                                    |                                              |                                |                |                                             |                                      |                                               |
| -0.405         | -0.511            | -0.488                         | -1.844**                        | -0.405                                       | -0.511                                         | -0.488                                           | -1.844**                                          | (0.264)                             | (0.268)                              | (0.270)                                      | (0.645)                      |                |                                             |                                      |                                               |
| -2.839         | -2.941            | -2.906                         | -3.233                          | -2.839                                       | -2.941                                         | -2.906                                           | -3.233                                            | (3.327)                             | (3.307)                              | (3.298)                                      | (2.985)                      |                |                                             |                                      |                                               |
| 0.262          |                   |                                |                                 |                                               |                                                  |                                                  |                      |                                    |                                              |                                |                |                                             |                                      |                                               |
| 0.350*         |                   |                                |                                 |                                               |                                                  |                                                  |                      |                                    |                                              |                                |                |                                             |                                      |                                               |
| -0.017         |                   |                                |                                 |                                               |                                                  |                                                  |                      |                                    |                                              |                                |                |                                             |                                      |                                               |

16
|                                      |       |       |       |       |       |       |       |       |       |
|--------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|                                      |       |       |       |       |       |       |       |       |       |
| Union centralization (mean) * Changes in real average wages (mean) |       |       |       |       |       |       |       |       |       |
|                                      |       |       |       |       |       |       |       |       |       |
| Constant                            | 0.378 | 0.413 | 0.402 | 1.065 | 0.536*| 0.575*| 0.565*| 1.310**|       |
|                                      | (0.308)| (0.310)| (0.311)| (0.579)| (0.268)| (0.268)| (0.269)| (0.472)|     |
| Random intercept variance (country)  | 0.031 | 0.032 | 0.031 | 0.038 | 0.005 | 0.005 | 0.006 | 0.000 |       |
|                                      | (0.057)| (0.057)| (0.057)| (0.045)| (0.059)| (0.059)| (0.059)| (0.000)|     |
| Random intercept variance (country-year) | 0.136*| 0.135*| 0.135*| 0.107*| 0.152*| 0.151*| 0.149*| 0.124***|       |
|                                      | (0.061)| (0.061)| (0.061)| (0.046)| (0.071)| (0.070)| (0.070)| (0.035)|     |
| N                                    | 14,945| 14,945| 14,945| 14,945| 14,463| 14,463| 14,463| 14,463|       |
| N countries                          | 19    | 19    | 19    | 19    | 18    | 18    | 18    | 18    |       |
| N country-years                      | 31    | 31    | 31    | 31    | 30    | 30    | 30    | 30    |       |

Standard errors in parentheses; M5-M8 exclude Iceland due to missing data.

*** p<0.001, ** p<0.01, * p<0.05
### Table A.7: Multilevel logistic random intercept regressions: Determinants of wage dissatisfaction; effects of wage bargaining structures and export-led growth; maximum likelihood estimates

|                                      | M1     | M2     | M3     | M4     |
|--------------------------------------|--------|--------|--------|--------|
| Occupational exposure: Public sheltered (Reference group: Exposed) | 0.292*** | 0.292*** | 0.279*** | 0.292*** |
|                                      | (0.047) | (0.047) | (0.048) | (0.047) |
| Private sheltered                    | 0.101*  | 0.101*  | 0.092*  | 0.102*  |
|                                      | (0.045) | (0.045) | (0.045) | (0.045) |
| Union member                         | 0.190*** | 0.194*** | 0.190*** | 0.190*** |
|                                      | (0.043) | (0.043) | (0.043) | (0.043) |
| Age                                  | 0.064*** | 0.064*** | 0.057*** | 0.063*** |
|                                      | (0.010) | (0.010) | (0.010) | (0.010) |
| Age squared                          | -0.001*** | -0.001*** | -0.001*** | -0.001*** |
|                                      | (0.000) | (0.000) | (0.000) | (0.000) |
| Female                               | 0.101**  | 0.102**  | 0.085*  | 0.101**  |
|                                      | (0.039) | (0.039) | (0.039) | (0.039) |
| Individual income                    | -0.249*** | -0.249*** | -0.248*** | -0.249*** |
|                                      | (0.010) | (0.010) | (0.010) | (0.010) |
| Employed part-time                   | -0.616*** | -0.617*** | -0.609*** | -0.616*** |
|                                      | (0.053) | (0.053) | (0.054) | (0.053) |
| Education: Upper secondary           | -0.192*** | -0.191*** | -0.193*** | -0.191*** |
| (Reference group: Below upper sec.) | (0.053) | (0.053) | (0.053) | (0.053) |
| Above upper secondary                | -0.070  | -0.070  | -0.071  | -0.068  |
|                                      | (0.057) | (0.057) | (0.058) | (0.057) |
| Tertiary                             | -0.093  | -0.093  | -0.095  | -0.092  |
|                                      | (0.054) | (0.054) | (0.055) | (0.054) |
| Year=2009                            | 0.235   | 0.310*  | 0.316*  | 0.226   |
| (Reference: 1999)                    | (0.126) | (0.139) | (0.140) | (0.127) |
|                                | Estimate 1 | Estimate 2 | Estimate 3 | Estimate 4 | Estimate 5 |
|--------------------------------|------------|------------|------------|------------|------------|
| Export-led growth (mean)       | -1.673***  | -1.478***  | -1.288**   | -0.969     |            |
|                                | (0.431)    | (0.393)    | (0.409)    | (1.148)    |            |
| Export-led growth (delta)      | -0.003     | -0.178     | -0.176     | 0.107      |            |
|                                | (0.624)    | (0.676)    | (0.672)    | (0.647)    |            |
| Wage bargaining coordination (mean) | 0.346  |            |            | 0.699      |            |
|                                | (0.271)    |            |            | (0.601)    |            |
| Wage bargaining coordination (delta) | 1.127 | 1.243      |            |            |            |
|                                | (0.788)    |            |            | (0.805)    |            |
| Level of wage bargaining (mean) |            | 0.054      |            |            |            |
|                                |            | (0.070)    |            |            |            |
| Level of wage bargaining (delta) |            | 0.068      |            |            |            |
|                                |            | (0.362)    |            |            |            |
| Union centralization (mean)    |            |            | -0.047     |            |            |
|                                |            |            | (0.256)    |            |            |
| Union centralization (delta)   |            |            | -1.494     |            |            |
|                                |            |            | (2.854)    |            |            |
| Export-led growth (mean) * Wage bargaining coordination (mean) | 0.798**  | 0.685*     | 0.898**    | 0.583      |            |
|                                | (0.265)    | (0.287)    | (0.278)    | (0.418)    |            |
| Constant                       |            |            |            |            |            |
|                                |            |            |            |            |            |
| Random intercept variance (country) | 0.017  | 0.004      | 0.005      | 0.015      |            |
|                                | (0.028)    | (0.031)    | (0.034)    | (0.028)    |            |
| Random intercept variance (country-year) | 0.085* | 0.106*     | 0.109*     | 0.085*     |            |
|                                | (0.034)    | (0.042)    | (0.045)    | (0.034)    |            |
| N                              | 14,945     | 14,945     | 14,463     | 14,945     |            |
| N countries                    | 19         | 19         | 18         | 19         |            |
| N country-years                | 31         | 31         | 30         | 31         |            |
Standard errors in parentheses; M3 excludes Iceland due to missing data
*** p<0.001, ** p<0.01, * p<0.05
Table A.8: Multilevel ordered logistic random intercept regressions: Determinants of wage dissatisfaction; maximum likelihood estimates

|                      | M1          | M2          | M3          |
|----------------------|-------------|-------------|-------------|
| Dependent variable:  | Wage        | Wage        | Wage        |
| dissatisfied         |             |             |             |
| **Age**              | 0.067***    | 0.066***    | 0.066***    |
|                      | (0.009)     | (0.009)     | (0.009)     |
| **Age squared**      | -0.001***   | -0.001***   | -0.001***   |
|                      | (0.000)     | (0.000)     | (0.000)     |
| **Female**           | 0.053       | 0.071*      | 0.071*      |
|                      | (0.036)     | (0.036)     | (0.035)     |
| **Occupational trade** | exposure (log) | -0.036***   | -0.036***   |
|                      | (0.006)     |             |             |
| **Public sector**    | 0.031       |             |             |
|                      | (0.039)     |             |             |
| **Union member**     | 0.165***    | 0.160***    | 0.159***    |
|                      | (0.039)     | (0.039)     | (0.039)     |
| **Individual income**| -0.264***   | -0.263***   | -0.262***   |
|                      | (0.009)     | (0.009)     | (0.009)     |
| **Employed part-time**| -0.593***   | -0.589***   | -0.587***   |
|                      | (0.049)     | (0.049)     | (0.049)     |
| **Education: Upper secondary** |            |            |             |
| (Reference group: Below upper sec.) | -0.151**   | -0.140**   | -0.148**   |
|                      | (0.048)     | (0.048)     | (0.048)     |
| **Above upper secondary** | -0.055      | -0.035     | -0.046      |
|                      | (0.052)     | (0.052)     | (0.052)     |
| **Tertiary**         | -0.062      | -0.041     | -0.051     |
|                      | (0.050)     | (0.049)     | (0.049)     |
| **Year=2009**        | 0.267       | 0.268      | 0.336*     |
| (Reference: 1999)    | (0.145)     | (0.147)     | (0.132)     |
| Occupational exposure: Public sheltered | 0.292*** | 0.292*** |
|----------------------------------------|----------|----------|
| (Reference group: Exposed)             | (0.042)  | (0.042)  |
| Private sheltered                      | 0.115**  | 0.113**  |
|                                        | (0.041)  | (0.041)  |
| Export-led growth (mean)               | -1.295***|          |
|                                        | (0.355)  |          |
| Export-led growth (delta)              | -0.030   |          |
|                                        | (0.649)  |          |
| cut1                                   | -6.148***| -5.837***|
|                                        | (0.265)  | (0.263)  | (0.293) |
| cut2                                   | -4.057***| -3.746***|
|                                        | (0.228)  | (0.226)  | (0.260) |
| cut3                                   | -0.499*  | -0.189   |
|                                        | (0.222)  | (0.220)  | (0.254) |
| cut4                                   | 2.075***  | 2.385*** |
|                                        | 1.848***  |          |
|                                        | (0.223)  | (0.221)  | (0.255) |
| Random intercept variance (country)    | 0.025    | 0.024    |
|                                        | 0.004    |          |
|                                        | (0.058)  | (0.060)  | (0.032) |
| Random intercept variance (country-year)| 0.139*  | 0.142*   |
|                                        | 0.109*   |          |
|                                        | (0.064)  | (0.065)  | (0.043) |
| Observations                           | 14,945   | 14,945   |
| Number of groups                       | 19       | 19       | 19       |

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05
|                          | M1       | M2       | M3       | M4       | M5       | M6       | M7       | M8       |
|--------------------------|----------|----------|----------|----------|----------|----------|----------|----------|
| **Occupational exposure**: |          |          |          |          |          |          |          |          |
| Public sheltered         | 0.292*** | 0.091    | 0.291*** | 0.300*** | 0.292*** | 0.314*** | 0.287*** | 0.345**  |
| (Reference group: Exposed)| (0.047)  | (0.115)  | (0.047)  | (0.080)  | (0.047)  | (0.084)  | (0.047)  | (0.117)  |
| Private sheltered        | 0.100*   | 0.001    | 0.100*   | 0.025    | 0.099*   | 0.038    | 0.091*   | -0.111   |
|                          | (0.045)  | (0.103)  | (0.045)  | (0.073)  | (0.045)  | (0.066)  | (0.046)  | (0.102)  |
| **Union member**         | 0.202*** | 0.204*** | 0.200*** | 0.200*** | 0.198*** | 0.198*** | 0.198*** | 0.198*** |
|                          | (0.043)  | (0.043)  | (0.042)  | (0.043)  | (0.043)  | (0.043)  | (0.043)  | (0.043)  |
| **Age**                  | 0.063*** | 0.063*** | 0.063*** | 0.064*** | 0.064*** | 0.063*** | 0.063*** | 0.063*** |
|                          | (0.010)  | (0.010)  | (0.010)  | (0.010)  | (0.010)  | (0.010)  | (0.010)  | (0.010)  |
| **Age squared**          | -0.001***| -0.001***| -0.001***| -0.001***| -0.001***| -0.001***| -0.001***| -0.001***|
|                          | (0.000)  | (0.000)  | (0.000)  | (0.000)  | (0.000)  | (0.000)  | (0.000)  | (0.000)  |
| **Female**               | 0.102**  | 0.101**  | 0.101**  | 0.100**  | 0.102**  | 0.102**  | 0.111**  | 0.110**  |
|                          | (0.039)  | (0.039)  | (0.039)  | (0.039)  | (0.039)  | (0.039)  | (0.039)  | (0.039)  |
| **Individual income**    | -0.249***| -0.249***| -0.249***| -0.249***| -0.249***| -0.249***| -0.252***| -0.251***|
|                          | (0.010)  | (0.010)  | (0.010)  | (0.010)  | (0.010)  | (0.010)  | (0.010)  | (0.010)  |
| **Employed part-time**   | -0.619***| -0.620***| -0.618***| -0.617***| -0.619***| -0.617***| -0.617***| -0.613***|
|                          | (0.053)  | (0.053)  | (0.053)  | (0.053)  | (0.053)  | (0.053)  | (0.054)  | (0.054)  |
| **Education: Upper secondary** |          |          |          |          |          |          |          |          |
| (Reference group: Below upper sec.) |          |          |          |          |          |          |          |          |
| Above upper secondary    | -0.061   | -0.060   | -0.066   | -0.065   | -0.067   | -0.068   | -0.060   | -0.058   |
|                          | (0.057)  | (0.057)  | (0.057)  | (0.057)  | (0.057)  | (0.057)  | (0.058)  | (0.058)  |
| Tertiary                 | -0.083   | -0.083   | -0.088   | -0.087   | -0.090   | -0.090   | -0.087   | -0.086   |
|                          | (0.054)  | (0.054)  | (0.054)  | (0.054)  | (0.054)  | (0.054)  | (0.054)  | (0.055)  |
| **Year=2009**            | 0.305*   | 0.305*   | 0.341*   | 0.338*   | 0.116    | 0.117    | 0.329*   | 0.324*   |

**Table A.9:** Multilevel logistic random intercept regressions: Determinants of wage dissatisfaction; alternative specifications of export-led growth; maximum likelihood estimates
| (Reference: 1999) | (0.154) | (0.153) | (0.140) | (0.140) | (0.144) | (0.144) | (0.159) | (0.159) |
|-------------------|---------|---------|---------|---------|---------|---------|---------|---------|
| Export-led growth (mean) | -0.241** | -0.279** | -0.372*** | -0.392*** | -1.039** | -1.073** | -1.379*** | -1.502*** |
|                    | (0.089) | (0.091) | (0.093) | (0.096) | (0.377) | (0.380) | (0.388) | (0.400) |
| Export-led growth (delta) | -0.060 | -0.061 | -0.092 | -0.089 | 1.381** | 1.350** | -0.937 | -0.945 |
|                     | (0.125) | (0.125) | (0.160) | (0.160) | (0.445) | (0.445) | (1.039) | (1.041) |
| Public sheltered * Export-led growth (mean) | 0.107 | -0.009 | -0.061 | -0.160 |
|                     | (0.056) | (0.068) | (0.180) | (0.291) |
| Private sheltered * Export-led growth (mean) | 0.055 | 0.082 | 0.147 | 0.576* |
|                     | (0.052) | (0.062) | (0.116) | (0.260) |
| Constant | 0.614* | 0.681* | 0.505* | 0.525* | 0.629* | 0.646* | 0.656* | 0.708** |
|                     | (0.277) | (0.279) | (0.236) | (0.237) | (0.266) | (0.267) | (0.262) | (0.265) |
| Random intercept variance (country) | 0.016 | 0.016 | 0.002 | 0.002 | 0.000 | 0.000 | 0.006 | 0.005 |
|                     | (0.040) | (0.039) | (0.029) | (0.030) | (0.000) | (0.000) | (0.032) | (0.032) |
| Random intercept variance (country-year) | 0.118* | 0.117* | 0.105* | 0.106* | 0.128*** | 0.127*** | 0.104* | 0.105* |
|                     | (0.049) | (0.048) | (0.041) | (0.041) | (0.035) | (0.035) | (0.043) | (0.043) |
| N                  | 14,945 | 14,945 | 14,945 | 14,945 | 14,945 | 14,945 | 14,521 | 14,521 |
| N countries        | 19     | 19     | 19     | 19     | 19     | 19     | 18     | 18     |
| N country-years    | 31     | 31     | 31     | 31     | 31     | 31     | 30     | 30     |

Standard errors in parentheses; replication of Table 1, Models 3 and 4; as measures of export-led growth, Models 1 and 2 use the absolute growth contribution of exports and Models 3 and 4 use the absolute growth contribution of exports * the share of export growth contribution in total growth; Models 5 to 8 use GDP growth in national currency instead of PPP; Models 7 and 8 exclude Japan.

*** p<0.001, ** p<0.01, * p<0.05
Table A.10: Multilevel logistic random intercept regressions: Determinants of wage dissatisfaction; accounting for sectoral wage differentials; maximum likelihood estimates; including (Models 1 to 6) and excluding (Models 7 to 12) outlier Portugal

| VARIABLES                              | M1     | M2     | M3     | M4     | M5     | M6     | M7     | M8     | M9     | M10    | M11    | M12    |
|----------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Age                                    | 0.058*** | 0.058*** | 0.058*** | 0.058*** | 0.058*** | 0.058*** | 0.058*** | 0.058*** | 0.058*** | 0.058*** | 0.058*** | 0.058*** |
|                                        | (0.010) | (0.010) | (0.010) | (0.010) | (0.010) | (0.010) | (0.011) | (0.011) | (0.011) | (0.011) | (0.011) | (0.011) |
| Age squared                            | 0.001*** | 0.001*** | 0.001*** | 0.001*** | 0.001*** | 0.001*** | 0.001*** | 0.001*** | 0.001*** | 0.001*** | 0.001*** | 0.001*** |
|                                        | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Female                                 | 0.057 | 0.073 | 0.057 | 0.072 | 0.057 | 0.074 | 0.070 | 0.088* | 0.070 | 0.088* | 0.070 | 0.089* |
|                                        | (0.041) | (0.040) | (0.041) | (0.040) | (0.041) | (0.040) | (0.042) | (0.041) | (0.042) | (0.041) | (0.042) | (0.041) |
| Occupational trade exposure (log)      | 0.032*** | 0.030 | 0.032*** | 0.035*** | -0.072 | 0.036*** | -0.072 | 0.036*** | -0.072 | 0.036*** | -0.072 | 0.036*** |
|                                        | (0.006) | (0.006) | (0.006) | (0.007) | (0.007) | (0.007) | (0.007) | (0.007) | (0.007) | (0.007) | (0.007) | (0.007) |
| Public sector                          | 0.058 | 0.059 | 0.057 | 0.050 | 0.049 | 0.049 | 0.048 | -0.087 | 1.037* | 0.188*** | -0.100* | -0.130** |
|                                        | (0.044) | (0.044) | (0.044) | (0.045) | (0.045) | (0.045) | (0.045) | (0.046) | (0.435) | (0.057) | (0.057) | (0.057) |
| Occupational exposure: Public sheltered | 0.201*** | 1.037* | 0.188*** | 0.164** | 0.228 | 0.146* | 0.228 | 0.146* | 0.228 | 0.146* | 0.228 | 0.146* |
| (Reference group: Private sheltered)   | (0.056) | (0.435) | (0.057) | (0.057) | (0.0593) | (0.0593) | (0.0593) | (0.0593) | (0.0593) | (0.0593) | (0.0593) | (0.0593) |
| Exposed                                | -0.087 | 1.037** | -0.100* | -0.130** | 0.243 | -0.149** | 0.243 | -0.149** | 0.243 | -0.149** | 0.243 | -0.149** |
|                                        | (0.046) | (0.327) | (0.047) | (0.048) | (0.469) | (0.469) | (0.469) | (0.469) | (0.469) | (0.469) | (0.469) | (0.469) |
| Union member                           | 0.209*** | 0.204*** | 0.209*** | 0.205*** | 0.208*** | 0.205*** | 0.208*** | 0.205*** | 0.208*** | 0.205*** | 0.208*** | 0.205*** |
|                                        | (0.044) | (0.044) | (0.044) | (0.044) | (0.044) | (0.044) | (0.044) | (0.044) | (0.044) | (0.044) | (0.044) | (0.044) |
| Individual income                      | 0.253*** | 0.253*** | 0.253*** | 0.252*** | 0.253*** | 0.252*** | 0.253*** | 0.252*** | 0.253*** | 0.252*** | 0.253*** | 0.252*** |
|                                        | (0.011) | (0.011) | (0.011) | (0.011) | (0.011) | (0.011) | (0.011) | (0.011) | (0.011) | (0.011) | (0.011) | (0.011) |
| Employed part-time                     | 0.633*** | 0.628*** | 0.633*** | 0.627*** | 0.634*** | 0.629*** | 0.643*** | 0.640*** | 0.643*** | 0.639*** | 0.643*** | 0.641*** |
|                                        | (0.056) | (0.056) | (0.056) | (0.056) | (0.056) | (0.056) | (0.056) | (0.056) | (0.056) | (0.056) | (0.056) | (0.056) |
| Education: Upper secondary             | 0.199*** | 0.190*** | 0.197*** | 0.195*** | 0.200*** | 0.188*** | 0.197*** | 0.188*** | 0.197*** | 0.188*** | 0.199*** | 0.185*** |

Dependent variable: Wage dissatisfaction.
### Wage Differential

|                                | Mean | Delta |
|--------------------------------|------|-------|
| Above upper secondary          |      |       |
|                                | 0.054 | 0.055 |
| Tertiary                       |      |       |
|                                | 0.057 | 0.056 |
| Year=2009                      |      |       |
|                                | 0.384 | 0.384 |
| Occupational trade exposure (log) * Wage differential (manufacturing/services; mean) | -0.053 | 0.031 |
| Public sheltered * Wage differential (manufacturing/services; mean) | -0.721 | -0.053 |
| Exposed * Wage differential (manufacturing/services; mean) | 0.968*** | -0.313 |
| Occupational trade exposure (log) * Wage differential (manufacturing/services; delta) | 0.103 | 0.151 |
| Public sheltered * Wage differential (manufacturing/services; delta) | 1.836 | 2.252 |
| Exposed * Wage differential (manufacturing/services; delta) | 1.581 | 2.146 |
| Model | Random intercept variance (country) | Random intercept variance (country-year) | Constant | Observations | Number of groups |
|-------|-----------------------------------|----------------------------------------|----------|--------------|-----------------|
|      | 0.008    0.007  0.008  0.008  0.005  0.016  0.015  0.016  0.016  0.016  0.013 |
|      | (0.048)  (0.050) (0.048) (0.048) (0.050) (0.038) (0.039) (0.038) (0.038) (0.038) | 0.130*  0.134*  0.129*  0.130*  0.136*  0.082*  0.085*  0.082*  0.084*  0.081*  0.088* |
|      | (0.059)  (0.061) (0.059) (0.059) (0.062) (0.041) (0.043) (0.041) (0.043) (0.041) | 1.390*  1.210*  1.008  0.497  1.397*  1.220*  0.072  -0.089  0.285  -0.282  0.078  -0.073 |
|      | (0.575)  (0.575) (0.638) (0.609) (0.576) (0.753) (0.757) (0.839) (0.813) (0.753) | 13,998  13,998  13,998  13,998  13,998  13,998  13,175  13,175  13,175  13,175  13,175 | 17  17  17  17  17  16  16  16  16  16  16 |

Standard errors in parentheses; Models 7 to 12 excluding Portugal
*** p<0.001, ** p<0.01, * p<0.05
**Figure A.1:** Export-led growth, sectoral wage differentials, and wage dissatisfaction; country averages

Note: The bivariate correlation in the left panel is $r=0.15$, $p=0.55$; without Portugal: $r=0.09$, $p=0.73$. The bivariate correlation in the right panel is $r=-0.32$, $p=0.21$; without Portugal: $r=-0.02$, $p=0.94$. 
Figure A.2: Average marginal effects of occupational trade exposure on wage dissatisfaction (left panel) and predicted probabilities of wage dissatisfaction (right panel), by sectoral wage differentials (levels) and occupational trade exposure

Note: Average marginal effects, predicted probabilities and 95 percent confidence intervals based on Table A.10, Models 9 and 10, excluding outlier Portugal (see Figure A.1). Average marginal effects and predicted probabilities are shown for the following values of sectoral wage differentials: 10th, 25th, 75th, 90th percentile. Irrespective of sectoral wage differentials, occupational trade exposure is associated with lower wage dissatisfaction, indicated by the consistently negative marginal effects of trade exposure (left panel) and the levels of dissatisfaction being consistently lower among exposed sector workers relative to public and private sheltered sector workers (right panel).
Figure A.3: Average marginal effects of occupational trade exposure on wage dissatisfaction (left panel) and predicted probabilities of wage dissatisfaction (right panel), by sectoral wage differentials (changes) and occupational trade exposure.

Note: Average marginal effects, predicted probabilities and 95 percent confidence intervals based on Table A.10, Models 11 and 12, excluding outlier Portugal (see Figure A.1). Average marginal effects and predicted probabilities are shown for the following values of sectoral wage differentials: 10th, 25th, 75th, 90th percentile. Irrespective of changes in sectoral wage differentials, occupational trade exposure is associated with lower wage dissatisfaction, indicated by the consistently negative marginal effects of trade exposure (left panel) and the levels of dissatisfaction being consistently lower among exposed sector workers relative to public and private sheltered sector workers (right panel).
Table A.11: Multilevel logistic random intercept regressions: Determinants of wage dissatisfaction; including an interaction between levels and changes of export-led growth; maximum likelihood estimates

| VARIABLES                                           | M1 |
|-----------------------------------------------------|----|
| Dependent variable: Wage dissatisfaction             |    |
| Age                                                 | 0.064*** (0.010) |
| Age squared                                         | -0.001*** (0.000) |
| Female                                              | 0.102** (0.039) |
| Occupational exposure: Public sheltered             | 0.292*** (0.047) |
| (Reference group: Exposed)                          |    |
| Private sheltered                                   | 0.100* (0.045) |
| Union member                                        | 0.195*** (0.043) |
| Individual income                                   | -0.249*** (0.010) |
| Employed part-time                                  | -0.617*** (0.053) |
| Education: Upper secondary                          | -0.192*** (0.053) |
| (Reference group: Below upper sec.)                 |    |
| Above upper secondary                               | -0.071 (0.057) |
| Tertiary                                            | -0.093 (0.054) |
| Year=2009                                           | 0.314* |
(Reference: 1999) (0.134)
Export-led growth (mean) -1.313***
(0.359)
Export-led growth (delta) -1.237
(1.819)
Export-led growth (mean) * Export-led growth (delta) 2.661
(4.258)
Random intercept variance (country) 0.005
(0.031)
Random intercept variance (country-year) 0.105*
(0.042)
Constant 0.751**
(0.268)

| Observations | 14,945 |
|-------------|-------|
| Number of groups | 19 |

Standard errors in parentheses

*** p<0.001, ** p<0.01, * p<0.05
Table A.12: Multilevel logistic random intercept regressions: Determinants of wage dissatisfaction; including random intercepts only at the country-year level; maximum likelihood estimates

| Variable                                | M1       | M2       | M3       | M4       |
|-----------------------------------------|----------|----------|----------|----------|
| **Dependent variable: Wage dissatisfaction** |          |          |          |          |
| Age                                     | 0.064*** | 0.064*** | 0.064*** | 0.057*** |
|                                         | (0.010)  | (0.010)  | (0.010)  | (0.010)  |
| Age squared                             | -0.001***| -0.001***| -0.001***| -0.001***|
|                                         | (0.000)  | (0.000)  | (0.000)  | (0.000)  |
| Female                                  | 0.102**  | 0.101**  | 0.101**  | 0.085*   |
|                                         | (0.039)  | (0.039)  | (0.039)  | (0.039)  |
| Occupational exposure: Public sheltered | 0.292*** | 0.292*** | 0.292*** | 0.279*** |
| (Reference group: Exposed)              | (0.047)  | (0.047)  | (0.047)  | (0.048)  |
| Private sheltered                       | 0.099*   | 0.102*   | 0.101*   | 0.093*   |
|                                         | (0.045)  | (0.045)  | (0.045)  | (0.045)  |
| Union member                            | 0.196*** | 0.199*** | 0.198*** | 0.193*** |
|                                         | (0.042)  | (0.043)  | (0.043)  | (0.043)  |
| Individual income                       | -0.249***| -0.250***| -0.250***| -0.249***|
|                                         | (0.010)  | (0.010)  | (0.010)  | (0.010)  |
| Employed part-time                      | -0.618***| -0.621***| -0.621***| -0.613***|
|                                         | (0.053)  | (0.053)  | (0.053)  | (0.054)  |
| Education: Upper secondary              | -0.191***| -0.182***| -0.183***| -0.186***|
| (Reference group: Below upper sec.)     | (0.053)  | (0.053)  | (0.053)  | (0.053)  |
| Above upper secondary                   | -0.071   | -0.059   | -0.060   | -0.062   |
|                                         | (0.057)  | (0.057)  | (0.057)  | (0.058)  |
| Tertiary                                | -0.093   | -0.081   | -0.082   | -0.086   |
|                                         | (0.054)  | (0.054)  | (0.054)  | (0.055)  |
| Year=2009                               | 0.297*   | 0.216    | 0.226    | 0.265    |
| (Reference: 1999)                       | (0.135)  | (0.158)  | (0.168)  | (0.161)  |
|                                | Estimate | Standard Error | t-value | p-value |
|--------------------------------|----------|----------------|---------|---------|
| Export-led growth (mean)       | -1.336***| (0.350)        | -3.81   | <0.001  |
| Export-led growth (delta)      | -0.159   | (0.658)        | -0.24   | 0.81    |
| Wage bargaining coordination (mean) | -0.278   | (0.253)        | -1.09   | 0.27    |
| Wage bargaining coordination (delta) | 0.900    | (0.959)        | 0.94    | 0.35    |
| Level of wage bargaining (mean) | -0.064   | (0.075)        | -0.84   | 0.40    |
| Level of wage bargaining (delta)| 0.040    | (0.427)        | 0.09    | 0.93    |
| Union centralization (mean)    | -0.406   | (0.260)        | -1.56   | 0.12    |
| Union centralization (delta)   | -2.890   | (3.306)        | -0.87   | 0.38    |
| Constant                       | 0.768**  | (0.264)        | 2.93    | <0.01   |
|                                | 0.363    | (0.254)        | 1.44    | 0.15    |
|                                | 0.381    | (0.301)        | 1.27    | 0.20    |
|                                | 0.537*   | (0.267)        | 2.02    | 0.04    |
| Random intercept variance (country-year) | 0.112*** | (0.031) | -3.91 | <0.001 |
|                                | 0.158*** | (0.043)        | -3.70   | <0.001  |
|                                | 0.166*** | (0.045)        | -3.67   | <0.001  |
|                                | 0.157*** | (0.043)        | -3.63   | <0.001  |
| Observations                   | 14,945   |                |         |         |
| N country-years                | 31       |                |         |         |

Standard errors in parentheses

*** p<0.001, ** p<0.01, * p<0.05