Occupational Skill Premia around the World: Appendices

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A   Additional Results

A.1   Studying Skill Premia using Occupational Wages

Our distinction between unskilled occupations (requiring at most primary education), medium skilled occupations (requiring some degree of secondary education), and skilled occupations (requiring post-secondary education) is taken from the ILO. However, the second skill level of the ILO (i.e., the "secondary education", and our "medium skilled", category) contains a broad range of occupations, ranging from some that arguably require only basic literacy and numeracy skills obtained at the latest during the first stage of secondary education (for instance occupation 26, "loom fixer, tuner"), to occupations arguably requiring more advanced skills from the second stage of secondary education or specialized vocational education (for instance occupation 131, "bank teller"). Hence, we further distinguish between *lower* medium skilled occupations, likely to require only basic secondary education, and *upper* medium skilled occupations, likely to require completed secondary education, based on the typical position of the occupations in countries' occupational wage rankings.

We estimate this position using the ranking of occupation fixed effects in a regression of ln wages that includes country, occupation and period fixed effects. In our preferred classification, among the occupations at the second skill level of the ILO, we classify the bottom two-thirds of the occupations in this ranking as "lower medium skilled" and the top third as "upper medium skilled", as this is a transparent criterion that yields a classification that is similar to the classification we got from a subjective estimation of skill requirements from the job descriptions. See appendix C for a full list of the occupations which includes their skill group.

We have probed the robustness of our analyses with respect to two alternative skill requirement classifications: a purely "theoretical" one, for which the differentiation between lower and upper medium skilled occupations is solely based on the inspection of job titles, and a purely "empirical" one that is solely based on the ranking of occupation fixed effects also for occupations classified as "unskilled" or "highly skilled" by the ILO. Compared to our benchmark skillgroup classification, the theoretical skill requirement classification for instance reclassifies "miners" from upper to lower medium skilled, and "hand compositors", "machine fitter-assemblers" and "mixing and blending machine operators" from lower to upper medium skilled. The empirical classification classifies the same number of occupations to the four skill groups as our preferred one, but picks them exclusively on the basis of the ranking of occupation fixed effects. Results using both alternative classifications tend to be similar to our benchmark results (available upon request).

Table A.1.1: Explanatory Power of Educational Attainment vs. Occupations in Accounting for US Wages in 2010

	(1)	(2)	(3)	(4)	(5)	(6)
Adjusted R^2	0.150	0.145	0.196	0.270	0.145	0.289
Occupations (9 categories)	✓		✓			
Education (9 categories)		✓	✓			
Detailed occupations (487 cat.)				✓		✓
Detailed education (23 cat.)					✓	✓
Observations	1,110,502	1,110,502	1,110,502	1,110,502	1,110,502	1,110,502

Source: IPUMS international. The dependent variable are ln annual wages, and the sample is restricted to employees aged 25-64 with positive reported income. All variables are net of the effects of gender, linear and quadratic age effects, and gender-age interactions. The 9 occupation categories correspond to the 9 ISCO major groups. The 9 most powerful education categories used in columns (2) and (3) are the eight highest attainment categories ("high school diploma", "graduate equivalency diploma (ged)", "some college, no degree", "associate dregree, type not specified", "bachelors degree", "masters degree", "professional degree", and "doctorate degree"), plus a residual category subsuming 8.3% of the sample with less than high school. In columns (5) and (6), specifications include additional dummies for the "no highschool" category ("kindergarten", "grade 1", "grade 2",...), including dummies for all 23 education categories available in the IPUMS data for the USA.

2000s vs. 1950s: Rho=0.76, pval=0.00

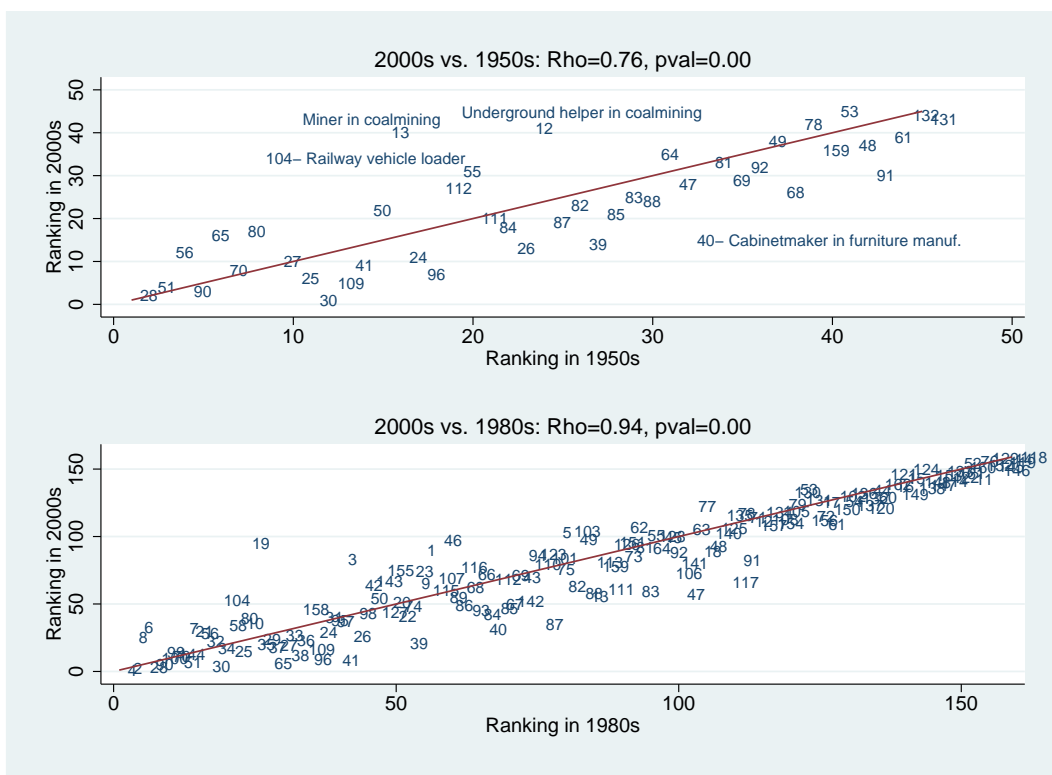**2000s vs. 1980s: Rho=0.94, pval=0.00**

Figure A.1.1: Correlation between Occupational Wage Rankings over Time

The ranks are based on the occupation fixed effects from a regression of log wages on country and occupation fixed effects. A higher rank corresponds to higher typical relative wages in the occupation. The labels are occupation codes, see appendix C for the corresponding occupation and industry titles. We use the balanced samples with log-linear inter-and extrapolations of gaps in wage series of up to one decade for these analyses (see note of figure A.2.1 for a description). Hence, the sample composition in term of countries and occupations is the same in both decades that are being compared. The top panel includes the 45 occupations available over the full period from 1953 to 2008. In the bottom panel, the comparison is made for the 159 occupations available from 1983 onwards. The top figure shows that even over a period of six decades, there is a relatively clear sense of which occupations are skilled and which are not. However, there are some exceptions: coalmining occupations were only medium skilled in the 1950s, but near the top of the wage distribution in the 2000s- arguably, because mining has become much more capital intensive, pushing up relative wages of (the remaining) coalminers. By contrast, cabinetmakers in furniture manufacturing used to be much more highly paid in the 1950. See Kunst (2019) for an analysis of the decline of the relative demand for craftsmen in manufacturing.

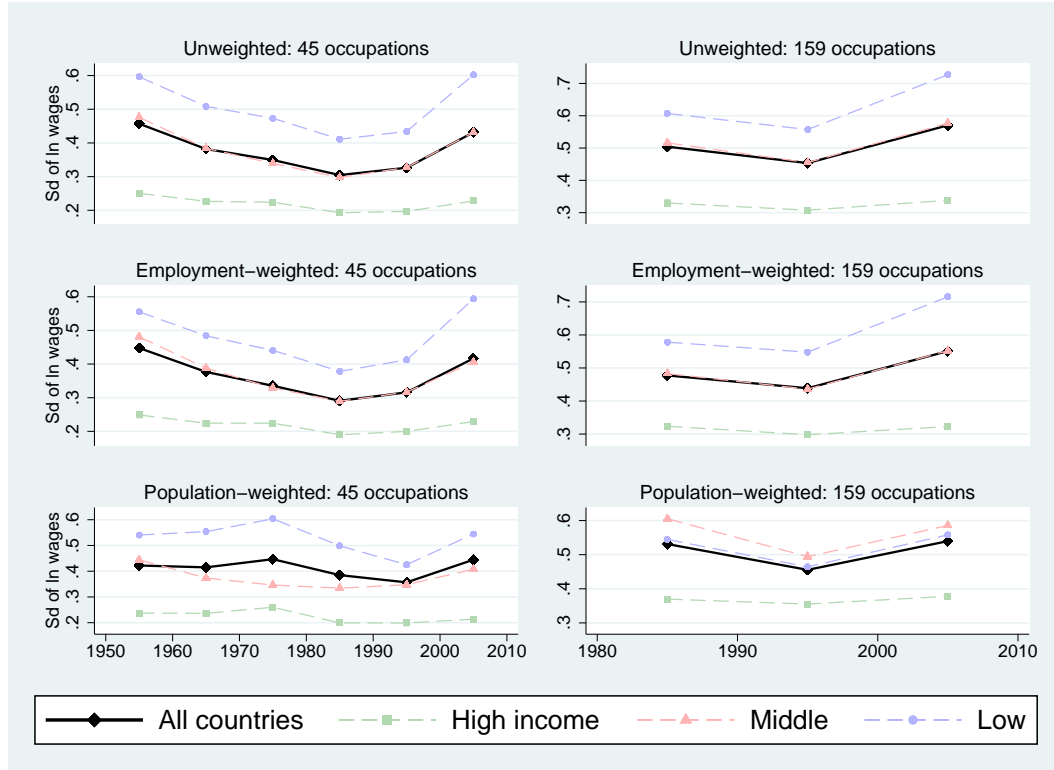## A.2 The Evolution of Occupational Skill Premia

Figure A.2.1: Evolution of Occupational Skill Premia in Balanced Samples and with Employment- or Population Weighting

The difference to figure 1 is that the averages for all periods are calculated for the same 91 countries in the left panel and 114 countries in the right panel, and for the same occupations in all decades. To create this balanced sample, we (i) take decadal averages of all available wage reports from a country, and (ii) fill gaps of up to one consecutive decade in a country-occupation series (including endpoints) by means of linear inter- or extrapolation of log wages. We discard all country-occupation wage series that cannot be completed in this way. For the extended sample available from the 1980s, we require that data are available for at least two out of the three decades. 15% of wages have been estimated in this way in the sample of 45 occupations, and 22% in the extended sample. In the middle panel, we calculate emploment-weighted country-level standard deviations. We calculate the weight of each occupation by (i) counting the wage reports from a country-period available in each 1-digit occupation-industry cell, and (ii) dividing the employment share estimate for the respective occupation-industry cell (obtained from I2D2, cf. section B.3) by the number of available wage reports. In the bottom panel, we weight countries by their estimated population when calculating the averages across countries or income groups. Population data is taken from the Penn World Tables, and missing population data for some decades is filled with (i) data from the World Development Indicators if available, and (ii) the data for the nearest decade with non-missing data otherwise. The 91 countries in the left panel cover between 55 and 59 percent of the world population (and include India, but not China), and the 114 countries in the right panel cover between 85 and 86 percent of the world population (and include both India and China).
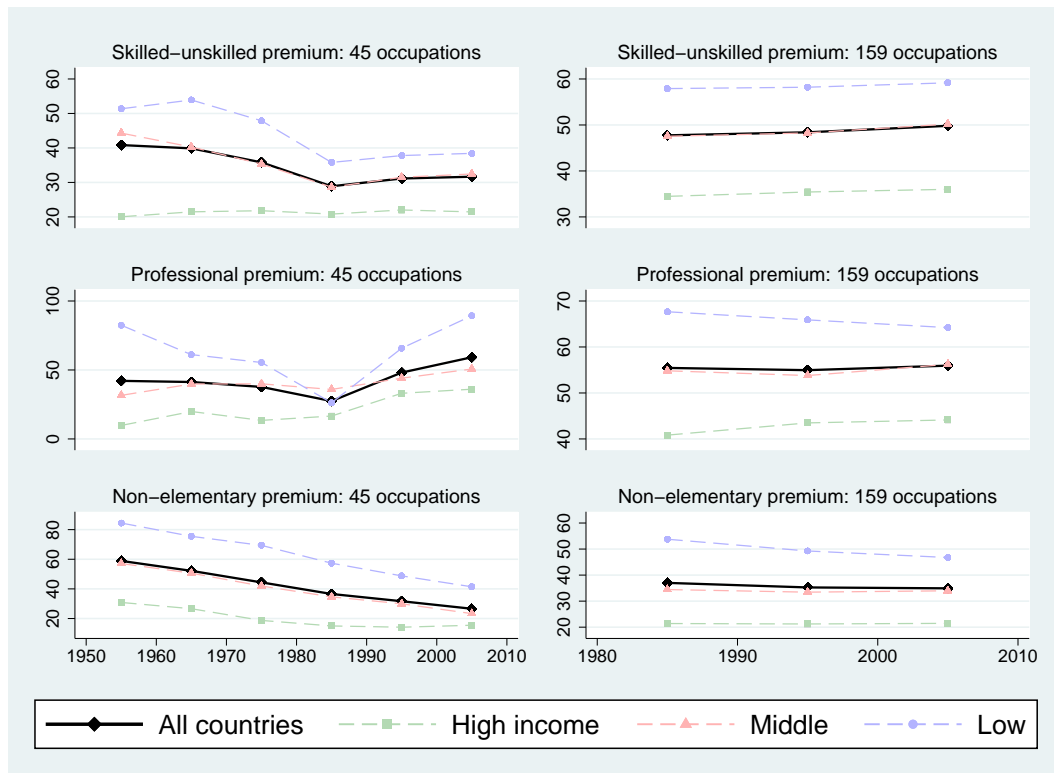
Figure A.2.2: Evolution of Skilled-unskilled Premia in Balanced Samples

The difference to figure A.2.1 is that each panel plots the evolution of the average wage premium of a "skilled" relative to an "unskilled" occupation group, in log points: In the top panel, we classify upper medium and high skilled occupations as "skilled". In the middle panel, we only consider high skilled occupations in major groups 1-3 as "skilled". In the bottom panel, we consider all high and medium skilled occupations as "skilled", so that the reference group consists only of the unskilled elementary occupations in major group 9.

Table A.2.1: Evidence on the Evolution of Occupational Skill Premia after 2008 from ILOSTAT and UBS

Source		Countries	Decrease (%)	Average early	Average late
ILOSTAT	All	75	62.7	60	59.4
ILOSTAT	-high income	19	57.9	64.7	61.1
ILOSTAT	-middle income	41	65.9	64.8	63.8
ILOSTAT	-low income	15	60	40.8	45.1
UBS	All	59	54.2	53.4	49.9
UBS	-high income	26	57.7	49.3	43.3
UBS	-middle income	28	57.1	53.3	49.1
UBS	-low income	5	20	75.4	88.8

The table summarizes evidence on the evolution of occupational skill premia from ILOSTAT and the UBS prices and earnings survey between the first and the last available year between 2009 and 2018 for each country. ILOSTAT collects monthly earnings at the level of the 9 ISCO major groups. We calculate a skill premium that is similar to our OWW "skilled-unskilled premium" by assigning the four highest-wage major groups (managers, professionals, associate professionals and clerks to the "skilled" category, and the other five major groups to the "unskilled" category. Monthly earnings for all 9 major groups are available for all countries, and the average time period is 2011 to 2016. The second data source is the "Prices and Earnings Survey" by UBS, which collects earnings for selected occupations from capitals around the world. To calculate "skilled-unskilled" premia from the UBS data, we use the approximate matching between OWW and UBS occupations done by Hammar and Waldenström (2019). For UBS, the number of occupations ranges from 10-14 with an average of 11 occupations, and the time period is 2009-2018 for all but one country (for which 2012 is the last year).

A.3 Additional Estimation Results
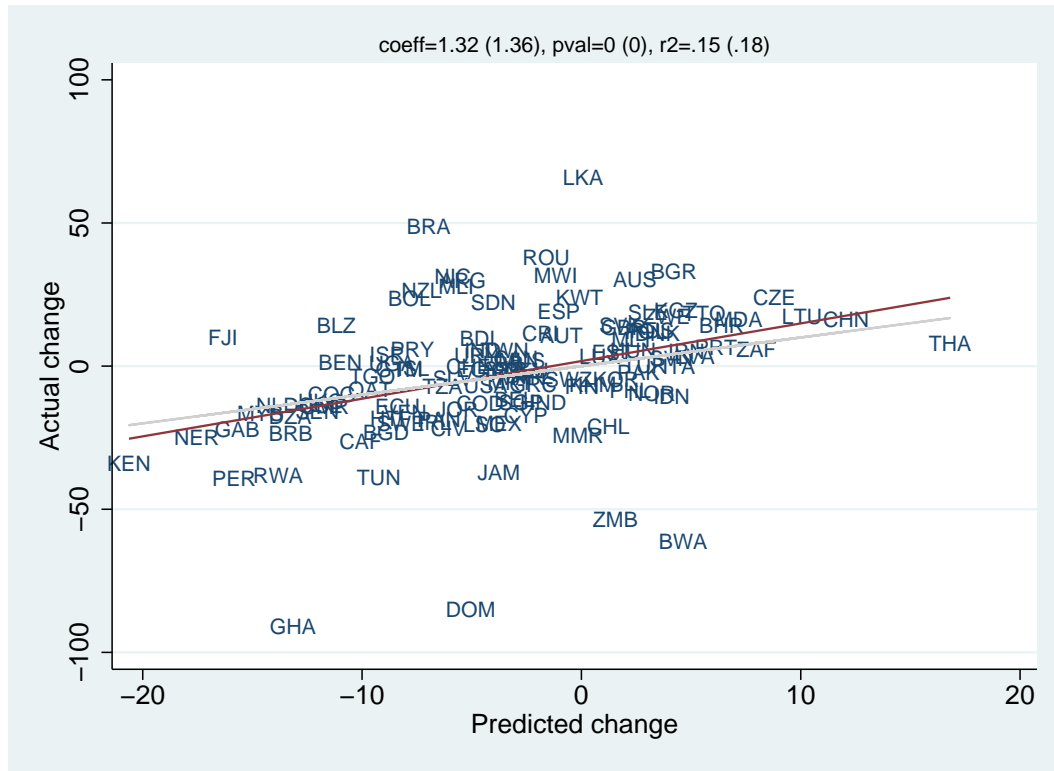
Figure A.3.1: Comparing the Actual Changes of the Skilled-Unskilled Premium over the Full Sample Period to the Changes Predicted by the Basic Model

The figure plots the simulation results that are also summarized in panel A of table 5. Hence, the predicted skill premium changes take into account changes in ln supply, period x skill group dummies, and GDP per worker. The title presents the results from a regression of actual on predicted wage premium changes. In brackets are the results from the same regression in which we give more weight to more precisely estimated wage premium changes, by weighting the wage premium changes from each country with the geometric mean of the square root of the number of skilled and unskilled occupations based on which it has been calculated. The solid line plots the slope of the (unweighted) regression, and the shaded line is a 45 degree reference line.

Table A.3.1: Regression Estimates of the Determinants of Occupational Wages in the Sample of 45 Occupations: Estimates by Occupation Skill Group

Dependent variable: ln real wage

	(1) low	(2) l. medium	(3) u. medium	(4) high	(5) low	(6) l. medium	(7) u. medium	(8) high
ln supply	-0.42$^+$	-0.50**	-0.33**	-0.21	-0.24	-0.24$^+$	-0.16	-0.02
	(0.21)	(0.14)	(0.10)	(0.20)	(0.23)	(0.13)	(0.13)	(0.22)
ln GDP/worker	0.70**	0.79**	0.82**	0.85**	0.98**	0.99**	0.77**	0.68*
	(0.10)	(0.07)	(0.08)	(0.16)	(0.16)	(0.13)	(0.14)	(0.27)
trade/GDP					-0.21	-0.30$^+$	-0.19	-0.66*
					(0.15)	(0.16)	(0.18)	(0.26)
union density					0.40$^+$	0.44*	0.24	0.42
					(0.20)	(0.17)	(0.19)	(0.36)
Country-occup. FE	✓	✓	✓	✓	✓	✓	✓	✓
Period FE	✓	✓	✓	✓	✓	✓	✓	✓
Countries	120	120	121	99	46	48	48	38
Occupations	8	25	10	2	8	25	10	2
Industries	8	13	6	2	8	13	6	2
Intervals	5 year	5 year	5 year	5 year	5 year	5 year	5 year	5 year
R2 (within)	0.37	0.33	0.32	0.26	0.67	0.65	0.59	0.64
Observations	4628	16181	6445	849	1460	5088	1969	238

Standard errors in parentheses, clustered at the country level. $^+$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$. The models include only the 45 occupation available for the full sample period. Columns (1)-(4) present results for the basic model separately by skill group, and columns (5)-(8) do the same disaggregation for the sample with trade and union density.

B   Data Appendix

B.1   Data Sources & Sample Information

Next to the extended OWW database, whose construction is presented in detail in Freeman and Oostendorp (2020), we use data from the following sources:

- Penn World Table 9.0 by Feenstra et al. (2015): real GDP per worker, contructed by dividing "rgdpna" (GDP in constant national prices in 2011 USD) by "emp" (number of persons engaged). GDP deflator for conversion of current USD wages to real wages in constant national prices in 2011 USD, constructed by dividing GDP in current USD ("v_gdp"/"xr2") by GDP in constant national prices ("rgdpna").

- Schooling dataset by Barro and Lee (2013), version 2.2: average educational attainments for the total population aged 15 and above. Data are available every 5 years, starting in 1950. We take the average of two neighboring reports to obtain our estimate for the corresponding 5 year-period.

- International Income Distribution database (I2D2): data retrieved from the World Bank in March 2019. See section B.2 for more details, and Montenegro and Hirn (2009) for a description of the database.

- World Development Indicators by World Bank (2019): data on merchandise trade/GDP, available from 1960 onwards.

- Data Base on Institutional Characteristics of Trade Unions, Wage Setting, State Intervention and Social Pacts, 1960-2017 (ICTWSS) by Visser (2019), version 6.0: "ud"- union density rate, net union membership as a proportion of wage earners in employment.

Table B.1.1 presents descriptive statistics on the variables in the regression samples in section 4 of the paper. While supply, GDP per worker, trade to GDP and union density are matched to multiple occupations in these regressions, the summary statistics are only calculated across the distinct country-period observations (or country-major group-period observations in the case of supply) in the samples in columns (2) (for supply and GDP/worker) or (5) (for trade/GDP and union density) of table 3.

Table B.1.1: Summary Statistics of Variables in the Regression Samples

	Observations	Countries	Mean	Standard deviation	Minimum	Maximum
ln real wage	51113	122	1.58	.93	-2.3	5.27
ln supply	5784	122	-2.38	.95	-9.31	-.13
ln GDP/worker	871	122	9.82	1.07	6.7	12.99
trade/GDP	277	48	.59	.54	.07	3.35
union density	277	48	.39	.21	.05	.93

B.2 Estimating the Occupational Employment Distribution by Education Level from I2D2

I2D2 is a collection of harmonized nationally representative surveys maintained by the World Bank, and introduced in Montenegro and Hirn (2009). It has been expanded considerably since its inception, and we use the surveys included in I2D2 as of March 2019. I2D2 is not yet publicly available, and we thank Kathleen G. Beegle, Claudio E. Montenegro, David Newhouse and Aditi Mishra for their help in accessing the data. We use the I2D2 surveys to estimate the distribution of occupational employment by education level as follows:

1. we restrict each sample to wage-employed men and women aged 15-64. We exclude workers classified as self-employed, non-wage employed or employer in order to match the OWW population.

2. we keep only surveys with harmonized information on the education level (no schooling, primary-, secondary- or post-secondary schooling) and the occupation (one of the 9 civilian major groups of ISCO-88). We also exclude about 9% of surveys that do not contain observations for all 9 major groups, as the discussion in Montenegro and Hirn (2009) raises the questions whether the standardization of national classifications has been fully successful for such surveys. The top row of table B.2.1 shows that this leaves us with a total of 881 surveys from 142 countries. The survey years range from 1960 to 2016, but only 3 percent of the surveys are from before 1990, and 16 percent from before 2000. The average survey year is 2005.

3. we calculate the occupational employment distribution for each survey and each of the four education levels, using the survey weights. We only estimate the employment distribution across the nine occupations for an education level if a survey includes at least 10 observation with the respective education level. This yields a maximum of 36 coefficients per survey if the occupational employment distribution can be estimated for all education levels (4 education levels x 9 occupations).

4. we calculate the average employment distribution for each country-education level if distributions from several surveys are available for a country, using the square root of the number of survey observations with the respective education level as a weight.

5. this procedure leaves us with a country-specific occupational employment distribution for all four education levels for 75 of the 122 countries in the basic model in column (1) of table 3. For the remaining 47 countries, we impute employment distributions with the average distribution of one of nine country-income groups: high income countries, and middle and low income countries by region as presented in table B.2.1. The selection of country-income groups was informed by an ANOVA of the coefficients from step 3, which revealed significant heterogeneity in employment distributions across these country-income groups. We did not distinguish between high income-countries from different regions as very few of them lie outside of Western Europe and North America.

Table B.2.1: Summary of I2D2 Surveys

| | Countries | Surveys | Avg. year | With employment distribution for...schooling | | | |
				no	primary	secondary	post-secondary
All	142	881	2005	656	812	872	856
High income	20	135	2007	42	105	135	135
Middle inc. Africa	17	78	2005	74	77	77	72
Middle inc. ECA	25	146	2006	40	111	143	132
Middle inc. rest Asia	16	126	2003	119	126	123	123
Middle inc. LACA	20	186	2002	180	185	186	186
Low inc. Africa	24	79	2007	74	77	77	77
Low inc. ECA	2	4	2007	2	4	4	4
Low inc. rest Asia	15	111	2005	109	111	111	111
Low inc. LACA	3	16	2003	16	16	16	16

"ECA" stands for Europe and Central Asia, "LACA" for Latin America. The last four columns indicate the number of surveys for which the occupational employment distribution for the respective educational attainment level could be estimated.

We have assessed the sensitivity of the supply elasticities in column (1) of table 3 to the following alternative ways of constructing the employment distributions:

- using only surveys from up to or after the year 2000

- excluding surveys in which the share of employees working in skilled occupations does not increase in the education level (up to post-secondary education for managers and professionals, and up to secondary education for clerks and associate professionals, allowing for a 5 percentage point tolerance)

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- calculating the income-region group average employment distributions only based on surveys for which employment distributions for all education levels could be estimated

- imputing missing country-specific employment distributions with coarser income group instead of income-region group averages

- using income-region or income group average employment distributions for *all* countries (even when country-specific employment distribuitions could be estimated)

- only keeping the 75 countries in the sample for which I2D2 allows for the construction of country-specific employment distributions

Supply elasticity point estimates always remain negative and significant. They range between -0.18 and -0.46 for the basic model (compared to the benchmark estimate of -0.32), and between -0.14 and -0.30 for the full model with trade/GDP and union density (compared to the benchmark estimate of -0.17).

B.3 OWW Occupations and I2D2 Surveys

This section addresses two questions:

1. what do the I2D2 surveys tell us about the share of wage employment covered by the occupations in OWW?

2. how much of the wage variation among the OWW occupations is *across* as opposed to *within* the nine major groups that the I2D2 surveys distinguish between?

To answer the first question, we can make use of the fact that the I2D2 surveys allow us to calculate the share of wage employment in each of 90 industry-occupation 'cells' (9 occupations x 10 industries). The first column of table B.3.1 presents the average employment shares by industry, aggregated across the 9 occupations, for 137 countries with the necessary occupation and industry variables. The second column shows the number of OWW occupations from the respective industry. We consider an industry-occupation cell to be represented in OWW if at least one of the OWW occupations can be matched to it, using the ILO correspondence between OWW occupations and the 1-digit ISIC-88 and ISCO-88 industry and occupation-classifications. The third column shows that industry-occupation cells covering a bit less than three quarters of all wage employment are represented in OWW. With the exception of agriculture, the occupation cells with representation in OWW cover more than half of the employment in all industries. The last two columns show that the 45 occupations available over the full period lack

representation of two service industries and agriculture, and cover industry-occupation cells that on average constitute about one third of all wage employment.

We have confirmed the robustness of our results in section 5 to weighting the occupational wages by their estimated employment when calculating the skilled-unskilled premia. We do this on the basis of the employment share for each of the 90 industry-occupation cells (10 industries x 9 occupations). For countries not in I2D2, we impute employment shares with the average for the corresponding income-region country group that we also use for the imputation of employment distributions by education level. More specifically, we construct an employment weight for each country-occupation by dividing the employment share by occupation-industry cell by the number of occupational wage reports from this cell that are available for a country. However, the distribution of employment weights is very skewed (not shown), and hence weighting comes at the cost of increased measurement error by putting more weight on a few wage reports with large weights. Moreover, reports from occupations with smaller employment shares can still be indicative of the wages paid for occupations with similar skill requirements. Hence, our benchmark results do not weight by estimated employment. However, results are similar when weighting the occupations by estimated employment (available upon request).

Table B.3.1: Estimated Employment Coverage of OWW Database

	Empl.	All OWW occupations		45 OWW occupations	
		No.	Empl. covered	No.	Empl. covered
Agriculture	10.3	10	3.8	0	
Mining & quarrying	1.3	9	1.1	2	.6
Manufacturing	14.2	55	12.8	23	11.9
Electricity, gas, water	2	5	1.5	2	.8
Construction	8.8	11	6.4	8	6.4
Wholesale, retail & hotels	13.9	11	11.8	4	8.9
Transport, storage & communication	7.6	28	6.7	4	4.4
Finance, insurance & real estate	7.5	9	4.5	2	1.5
Public administration	20.5	8	13	0	
Other services	14.1	16	10	0	
TOTAL	100	162	71.6	45	34.5

The first column shows the average share in civilian working age employment across 137 countries in I2D2 by industry. The second column contains the number of distinct OWW occupations in the respective industry. All of these occupations belong to one of nine ISCO-88 major groups. The third column contains the total share of civilian employment in major groups for which OWW contains at least one occupation from the respective industry. Columns four and five present the corresponding numbers only for the 45 occupations included in OWW over the full sample period.

The second question matters since I2D2 only allows us to construct our occupational

labor supplies at the major group level (for lack of a more detailed harmonized occupation classification in the I2D2 surveys). Hence, we can only hope to explain changes in occupational wages and skill premia that play out *across* (as opposed to *within*) major groups with our occupational labor supply variable. Figure B.3.1 plots the typical deviation of occupational wage reports from the average wage reported by a country in the wage data for each of the major groups. It shows that there is considerable variation between major groups: major group-dummies explain 60 percent of the variation of occupation fixed effects among all occupations (which increases to 68 percent when excluding four highly paid occupations in the airline industry), and 69 percent of the variation among the 45 occupations available throughout the full period. Hence, while constructing our supply measure at the major group level introduces measurement error, we expect it to be relevant to explaining wage changes in OWW.
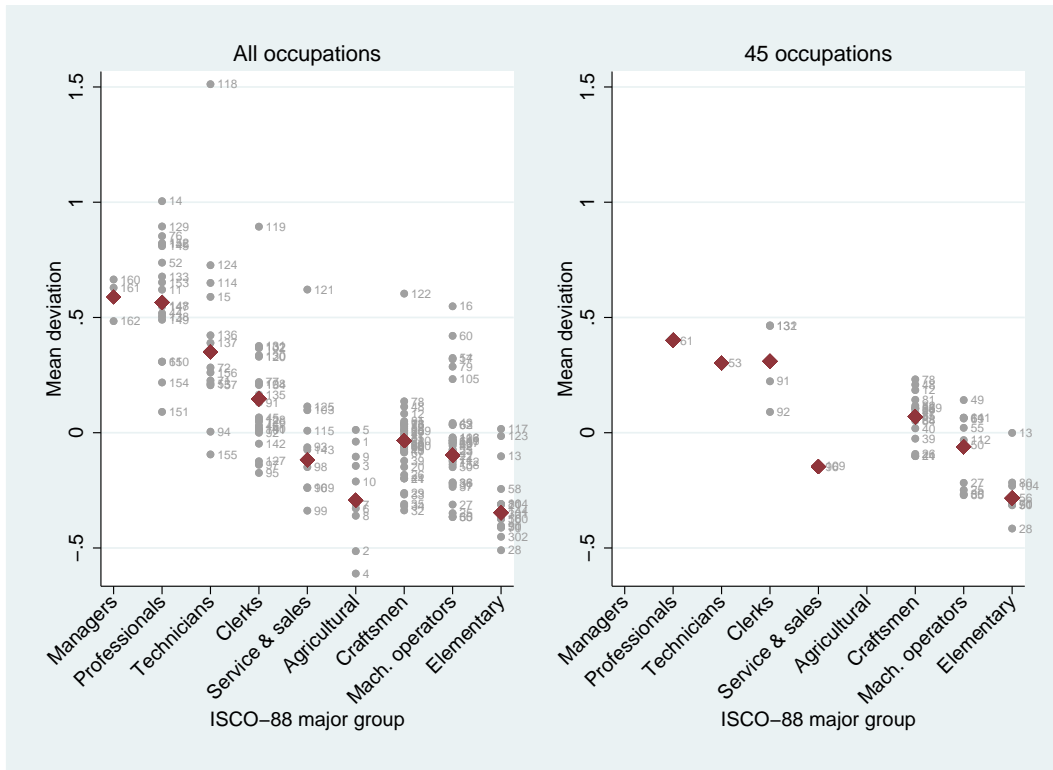
Figure B.3.1: Dispersion of OWW Wages Within vs. Across Major Groups

Fixed effects are from a regression of log real wages on country, year and occupation or major group dummies. The occupation fixed effects are shown in light grey, labelled with the corresponding occupation code. The fixed effects for the corresponding major group are given by the triangle. Major group dummies account for 60% of the variation of occupation fixed effects among all occupations, and for 69% of the variation among the 45 occupations available for the full period. In the full sample, the explained variation increases to 68% when excluding four highly paid occupations in the airline industry. The labels are occupation codes, cf. appendix C.

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C List of OWW Occupations, Industries and Countries

45 occupations included 1953-2008

Skill group*	Occupation			Industry	Reports	
	Name	Survey code	ISCO -88		Countries (total)	By year (avg.)
1	Underground helper, loader	13	93	BA	82	17.4
1	Labourer	28	93	DA	145	42.5
1	Labourer	51	93	FB	161	51.8
1	Labourer	56	93	GA	142	39.1
1	Labourer	70	93	JB	142	38.6
1	Labourer	80	93	KA	158	51.2
1	Labourer	90	93	LA	168	60.5
1	Railway vehicle loader	104	93	NA	124	31.6
2	Baker (ovenman)	24	74	CH	163	55.9
2	Thread and yarn spinner	25	82	DA	142	40.5
2	Loom fixer, tuner	26	74	DA	133	35.5
2	Cloth weaver (machine)	27	82	DA	143	41.4
2	Sewing-machine operator	30	82	DB	161	50.5
2	Furniture upholsterer	39	74	EB	159	50
2	Cabinetmaker	40	74	EB	160	55.9
2	Wooden furniture finisher	41	74	EB	156	47.1
2	Hand compositor	47	73	FB	159	56.9
2	Bookbinder (machine)	50	82	FB	160	54.1
2	Mixing- and blending-machine operator	55	82	GA	142	34.1
2	Metal melter	64	81	IA	121	29.7
2	Labourer	65	81	IA	130	32.1
2	Bench moulder (metal)	68	72	JB	133	36.5
2	Machine fitter-assembler	69	82	JB	141	40.8
2	Building painter	84	71	LA	168	60.1

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2	Bricklayer (construction)	85	71	LA	167	59.3
2	Cement finisher	87	71	LA	156	49.7
2	Construction carpenter	88	71	LA	168	62
2	Stock records clerk	92	41	MA	161	47.7
2	Salesperson	96	52	MB	162	52
2	Bus conductor	109	51	NB	153	44.2
2	Motor bus driver	111	83	NB	163	52.5
2	Urban motor truck driver	112	83	NC	158	46.6
2	Automobile mechanic	159	72	PF	159	56.1
3	Miner	12	71	BA	81	18.7
3	Machine compositor	48	73	FB	158	54.6
3	Printing pressman	49	82	FB	160	56.8
3	Electric power lineman	78	72	KA	162	53.7
3	Building electrician	81	71	LA	166	57.6
3	Plumber	82	71	LA	167	58.5
3	Construction steel erector	83	72	LA	162	47.7
3	Stenographer-typist	91	41	MA	155	46
3	Bank teller	131	42	OA	163	49.2
3	Book-keeping machine operator	132	41	OA	156	44.5
4	Chemistry technician	53	31	GA	144	32.5
4	Occupational health nurse	61	22	IA	117	22.7

*1=unskilled, 2=lower medium skilled, 3=upper medium skilled, 4=high skilled

Occupations included 1953-1982

Skill group*	Occupation			Industry	Reports	
	Name	Survey code	ISCO -88		Countries (total)	By year (avg.)
1	Permanent way labourers	301	93	NA	116	40.7
1	Labourers (unskilled, public parks and gardens)	302	91	PB	134	56.3
2	Pattern makers (wood)	300	71	JB	107	38.8

*1=unskilled, 2=lower medium skilled, 3=upper medium skilled, 4=high skilled

Skill group*	Occupation			Industry	Reports	
	Name	Survey code	ISCO -88		Countries (total)	By year (avg.)
1	Packer	21	93	CA	105	31.5
1	Packer	58	93	GB	94	28.1
1	Room attendant or chambermaid	100	91	MC	127	41.6
1	Dockworker	117	93	NE	87	24.4
1	Aircraft loader	123	93	NF	104	25.7
1	Refuse collector	144	91	PB	101	29.9
2	Farm supervisor	1	61	AA	93	22.9
2	Field crop farm worker	2	61	AA	105	28.2
2	Plantation supervisor	3	61	AB	79	18
2	Plantation worker	4	61	AB	85	21.2
2	Forest supervisor	5	61	AC	93	20.5
2	Forestry worker	6	61	AC	96	23.8
2	Logger	7	61	AD	82	20.5
2	Tree feller and bucker	8	61	AD	73	15.7
2	Deep-sea fisherman	9	61	AE	57	11.9
2	Inshore (coastal) maritime fisherman	10	61	AE	63	11.2
2	Quarryman	19	71	BC	82	23.8
2	Butcher	20	74	CA	115	35.4
2	Dairy product processor	22	82	CB	107	34.7
2	Grain miller	23	82	CG	105	31.6
2	Garment cutter	29	74	DB	124	37.5
2	Tanner	31	82	DC	95	26.1
2	Leather goods maker	32	74	DC	99	26.9
2	Clicker cutter (machine)	33	74	DD	103	28.9
2	Laster	34	74	DD	96	27
2	Show sewer (machine)	35	74	DD	105	30.8
2	Sawmill sawyer	36	81	EA	107	33

2	Veneer cutter	37	81	EA	91	25.6
2	Plywood press operator	38	81	EA	87	24.2
2	Wood grinder	42	81	FA	75	20.9
2	Paper-making-machine operator (wet end)	43	81	FA	83	25.2
2	Metalworking machine setter	66	72	JA	106	32
2	Welder	67	72	JA	114	38.8
2	Electronic equipment assembler	74	82	JC	85	25.5
2	Reinforced concreter	86	71	LA	122	33.9
2	Plasterer	89	71	LA	116	33
2	Salesperson	93	52	MA	125	38.7
2	Cash desk cashier	95	42	MB	129	40.2
2	Hotel receptionist	97	42	MC	126	41.3
2	Cook	98	51	MC	130	45.2
2	Waiter	99	51	MC	130	44.3
2	Ticket seller (cash desk cashier)	101	42	NA	80	23.7
2	Railway steam-engine fireman	106	81	NA	51	11.8
2	Railway signalman	107	83	NA	77	21
2	Automobile mechanic	110	72	NB	118	37.2
2	Long-distance motor truck driver	113	83	NC	104	29.7
2	Ship's steward (passenger)	115	51	ND	68	16.1
2	Able seaman	116	83	ND	85	22.6
2	Postman	127	41	NH	117	34.5
2	Stenograper-typist	140	41	PA	105	29.8
2	Card- and tape-punching machine operator	141	41	PA	87	23.8
2	Office clerk	142	41	PA	110	33.3
2	Fire-fighter	143	51	PA	95	27.2
2	Ambulance driver	158	83	PD	113	34.5
3	Supervisor or general foreman	16	81	BB	65	17.2
3	Derricksman	17	81	BB	65	15.4
3	Miner	18	71	BC	81	21.7
3	Stenographer-typist	45	41	FB	118	33
3	Office clerk	46	41	FB	120	36.7
3	Supervisor or general foreman	54	82	GA	102	27.9
3	Controlman	60	81	GC	69	20.2
3	Blast furnaceman (ore smelting)	62	81	IA	71	22.7

3	Hot-roller (steel)	63	81	IA	67	21.7
3	Electronics fitter	73	72	JC	81	21.8
3	Ship plater	75	72	JD	62	18.8
3	Office clerk	77	41	KA	116	34.1
3	Power-generating machinery operator	79	81	KA	115	32.8
3	Railway services supervisor	102	41	NA	82	20.7
3	Railway passenger train guard	103	51	NA	74	20.3
3	Railway engine-driver	105	83	NA	86	25
3	Road transport services supervisor	108	41	NB	105	29.7
3	Flight operations officer	119	41	NF	100	24
3	Airline ground receptionist	120	42	NF	105	27.2
3	Aircraft cabin attendant	121	51	NF	104	27.7
3	Aircraft engine mechanic	122	72	NF	111	27.5
3	Aircraft accident fire-fighter	125	51	NG	86	20.5
3	Post office counter clerk	126	42	NH	114	32.5
3	Telephone switchboard operator	128	42	NH	115	35
3	Stenographer-typist	130	41	OA	116	35.5
3	Stenographer-typist	134	41	OB	103	32.1
3	Card- and tape-punching machine operator	135	41	OB	92	24
4	Coalmining engineer	11	21	BA	49	13.1
4	Petroleum and natural gas engineer	14	21	BB	60	16.4
4	Petroleum and natural gas extraction technician	15	31	BB	64	15.9
4	Journalist	44	24	FB	113	33.5
4	Chemical engineer	52	21	GA	100	27.6
4	Electronics draughtsman	71	31	JC	70	19.4
4	Electronics engineering technician	72	31	JC	86	23.8
4	Power distribution and transmission engineer	76	21	KA	118	33.4
4	Book-keeper	94	34	MB	125	37
4	Ship's chief engineer	114	31	ND	79	20.7
4	Air transport pilot	118	31	NF	110	27.3
4	Air traffic controller	124	31	NG	98	27.2
4	Accountant	129	24	OA	118	37.1
4	Computer programmer	133	21	OB	97	28.2

4	Insurance agent	136	34	OB	103	29
4	Clerks of work	137	31	OC	89	22.7
4	Computer programmer	138	21	PA	97	27.7
4	Mathematics teacher (third level)	145	23	PC	118	33.7
4	Teacher in languages and literature (third level)	146	23	PC	114	31.1
4	Teacher in languages and literature (second level)	147	23	PC	120	36.2
4	Mathematics teacher (second level)	148	23	PC	117	34.8
4	Technical education teacher (second level)	149	23	PC	114	33.8
4	First-level education teacher	150	33	PC	118	37.8
4	Kindergarten-teacher	151	33	PC	113	34.6
4	General physician	152	22	PD	121	39.2
4	Dentist (general)	153	22	PD	114	33.8
4	Professional nurse (general)	154	22	PD	122	42.7
4	Auxiliary nurse	155	32	PD	118	39.3
4	Physiotherapist	156	32	PD	109	32.9
4	Medical X-ray technician	157	31	PD	112	35.4
4	Government executive official - central	160	11	PA	95	25.3
4	Government executive official - regional or provincial	161	11	PA	77	16.5
4	Government executive official - local authority	162	11	PA	79	18.8

*1=unskilled, 2=lower medium skilled, 3=upper medium skilled, 4=high skilled

Industries of OWW occupations

Industry code	Industry name	ISIC-88
AA	Agricultural production (field crops)	11
AB	Plantations	11
AC	Forestry	12
AD	Logging	12
AE	Deep-sea and coastal fishing	13

BA	Coalmining	21
BB	Crude petroleum and natural gas production	22
BC	Other mining and quarrying	29
CA	Slaughtering, preparing and preserving meat	31
CB	Manufacture of dairy products	31
CG	Grain mill products	31
CH	Manufacture of bakery products	31
DA	Spinning, weaving and finishing textiles	32
DB	Manufacture of wearing apparel (exc. footwear)	32
DC	Manufacture of Leather and Leather Products (exc. footwear)	32
DD	Manufacture of footwear	32
EA	Sawmills, planing and other wood mills	33
EB	Manufacture of wooden furniture and fixtures	33
FA	Manufacture of pulp, paper and paperboard	34
FB	Printing, publishing and allied industries	34
GA	Manufacture of industrial chemicals	35
GB	Manufacture of other chemical products	35
GC	Petroleum refineries	35
IA	Iron and steel basic industries	37
JA	Manufacture of metal products (exc. machinery and equipment)	38
JB	Manufacture of machinery (exc. electrical)	38
JC	Manufacture of electronic equipment, machinery and supplies	38
JD	Shipbuilding and repairing	38
KA	Electric light and power	41
LA	Construction	5
MA	Wholesale trade (grocery)	61
MB	Retail trade (grocery)	62
MC	Restaurants and hotels	63
NA	Railway transport	71
NB	Passenger transport by road	71
NC	Freight transport by road	71
ND	Maritime transport	71
NE	Supporting services to maritime transport	71
NF	Air transport	71
NG	Supporting services to air transport	71
NH	Communication	72
OA	Banks	81

OB	Insurance		82
OC	Engineering and architectural services		83
PA	Public administration		91
PB	Sanitary services		92
PC	Education services		93
PD	Medical and dental services		93
PF	Repair of motor vehicles		95

High income countries

Country code + name	Reported occs	Years with reports			Avg. reports by sample	
		Total	First	Last	45 occs	1983-08
AUS - Australia	156	49	1953	2006	42.1	129.7
AUT - Austria	152	50	1953	2002	43.5	133.9
BEL - Belgium	72	52	1953	2004	33.6	41.9
BHS - Bahamas	111	17	1965	2007	15.4	37.8
BRN - Brunei Darussalam	38	14	1964	2002	18.4	17.3
CAN - Canada	131	41	1953	2008	24.7	86.4
CHE - Switzerland	28	32	1953	1984	25.3	24.5
CYP - Cyprus	135	52	1953	2006	30.1	101.9
DEU - Germany	160	56	1953	2008	42.1	153.0
DNK - Denmark	128	28	1953	2007	24.1	71.1
ESP - Spain	48	23	1953	1976	44.3	
FIN - Finland	143	54	1953	2007	34.4	107.2
FRA - France	20	27	1955	2000	6.7	1.0
GBR - United Kingdom	161	55	1953	2008	30.4	76.4
HKG - Hong Kong SAR, China	82	54	1953	2008	30.7	34.7
IRL - Ireland	91	32	1953	1984	36.3	79.0
ISL - Iceland	68	54	1953	2008	19.5	15.4
ISR - Israel	54	27	1953	1984	29.7	21.0
ITA - Italy	154	53	1953	2008	40.4	138.7
JPN - Japan	69	46	1953	2008	21.7	37.5
KWT - Kuwait	138	8	1961	2004	32.6	126.0
LUX - Luxembourg	88	4	1977	2006	18.5	54.7

NLD - Netherlands	107	38	1953	1990	36.9	76.5
NOR - Norway	79	54	1955	2008	10.3	30.0
NZL - New Zealand	153	39	1953	1991	41.5	122.2
QAT - Qatar	35	7	1972	1981	30.1	
SGP - Singapore	152	46	1953	2007	32.8	87.4
SWE - Sweden	148	43	1953	1995	32.3	94.3
TWN - Taiwan, China	102	21	1953	2004	40.9	77.7
USA - United States	155	55	1953	2007	26.3	97.8

Middle income countries

Country code + name	Reported occs	Years with reports			Avg. reports by sample	
		Total	First	Last	45 occs	1983-08
AGO - Angola	161	7	1959	1999	36.1	131.0
ARG - Argentina	150	44	1953	2008	24.9	54.8
ATG - Antigua and Barbuda	129	19	1964	1996	23.4	64.9
AZE - Azerbaijan	52	12	1996	2008	7.2	39.1
BGR - Bulgaria	143	2	1990	2002	38.0	116.5
BHR - Bahrain	120	24	1978	2006	15.3	52.3
BLR - Belarus	65	11	1995	2007	28.4	59.9
BLZ - Belize	112	36	1953	1995	26.7	90.5
BOL - Bolivia	149	19	1953	1999	36.3	102.5
BRA - Brazil	144	16	1958	2006	28.3	53.0
BRB - Barbados	118	39	1953	1995	28.3	75.0
BWA - Botswana	84	8	1975	2007	17.4	37.8
CHL - Chile	145	20	1953	2007	37.7	88.8
CIV - CÃŽte d'Ivoire	161	27	1956	2001	35.1	96.4
CMR - Cameroon	123	36	1956	1992	30.8	56.8
COG - Congo R	46	12	1956	1979	30.5	
COL - Colombia	143	7	1958	1990	27.9	73.3
CPV - Cabo Verde	83	5	1976	1986	20.8	79.5
CRI - Costa Rica	162	39	1958	2008	39.7	112.3
CSK - Czechoslovakia	123	26	1958	1992	32.8	90.7
CUB - Cuba	149	16	1955	2008	36.1	117.8

CZE - Czech Republic	136	16	1993	2008	36.8	109.8
DJI - Djibouti	72	4	1960	1996	22.3	49.0
DMA - Dominica	31	11	1957	1984	14.3	7.0
DOM - Dominican Republic	115	20	1954	1997	25.2	71.5
DZA - Algeria	151	31	1953	2008	23.1	53.3
ECU - Ecuador	47	5	1958	1979	31.4	
EST - Estonia	139	5	1993	1997	30.4	103.4
FJI - Fiji	139	23	1953	1988	25.0	102.5
GAB - Gabon	113	23	1956	1995	21.0	45.8
GRC - Greece	48	32	1953	1984	41.4	41.0
GRD - Grenada	108	22	1955	1995	22.7	86.3
GTM - Guatemala	153	21	1953	1998	32.0	53.0
HRV - Croatia	117	1	1996	1996	32.0	117.0
HUN - Hungary	149	38	1957	2007	28.3	124.6
IRN - Iran, Islamic Rep	71	6	1959	1986	24.5	43.0
IRQ - Iraq	41	3	1959	1961	38.3	
JAM - Jamaica	45	18	1953	1979	20.4	
JOR - Jordan	155	32	1958	2006	30.3	105.9
KAZ - Kazakhstan	115	3	2002	2004	35.0	114.0
KGZ - Kyrgyz Republic	66	5	1994	2002	13.2	43.0
KNA - Saint Kitts and Nevis	103	16	1964	2000	23.9	78.3
KOR - Korea, Rep	159	37	1955	2006	34.6	133.4
LBN - Lebanon	48	10	1955	1968	41.0	
LBY - Libya	34	2	1975	1979	21.0	
LCA - Saint Lucia	111	36	1955	1991	22.1	71.8
LTU - Lithuania	139	4	1995	2006	27.0	90.3
LVA - Latvia	146	10	1997	2006	35.5	118.5
MAR - Morocco	48	20	1953	1979	38.8	
MDA - Moldova	122	15	1994	2008	28.5	88.7
MEX - Mexico	148	43	1955	2008	30.6	84.8
MLT - Malta	35	20	1953	1985	23.6	7.0
MNG - Mongolia	22	2	1994	1995		22.0
MUS - Mauritius	118	55	1954	2008	24.9	77.3
MYS - Malaysia	121	39	1953	1995	29.9	30.8
NAM - Namibia	36	3	1996	1998	5.0	17.0
NIC - Nicaragua	112	20	1957	2002	24.7	61.9
PAN - Panama	47	9	1969	1979	28.9	

PER - Peru	152	38	1963	2008	31.6	72.7
PHL - Philippines	139	35	1954	2008	23.0	38.9
PNG - Papua New Guinea	147	7	1979	1996	19.9	88.4
POL - Poland	159	7	1996	2006	43.1	148.9
PRI - Puerto Rico	116	55	1953	2008	22.5	49.0
PRT - Portugal	145	48	1953	2007	24.9	72.4
PRY - Paraguay	47	13	1953	1982	37.7	
PSE - West Bank and Gaza	6	2	2007	2008	2.0	5.0
ROU - Romania	162	28	1973	2008	43.5	152.9
RUS - Russian Federation	128	13	1988	2007	22.3	55.5
SEN - Senegal	91	21	1956	1992	32.2	49.3
SLV - El Salvador	149	25	1959	2008	36.3	123.7
SUR - Suriname	147	29	1960	1998	21.5	65.9
SVK - Slovak Republic	155	13	1995	2007	39.7	126.8
SVN - Slovenia	102	4	1991	1997	29.3	73.8
SWZ - Swaziland	81	11	1975	1993	27.0	31.2
SYC - Seychelles	114	19	1965	1991	23.1	70.2
SYR - Syrian Arab Republic	47	23	1953	1995	33.0	8.0
THA - Thailand	141	22	1954	2006	31.9	109.7
TON - Tonga	74	7	1964	1985	21.7	43.5
TTO - Trinidad and Tobago	138	35	1953	2000	26.7	98.2
TUN - Tunisia	128	34	1954	1997	33.5	59.8
TUR - Turkey	153	10	1958	2006	26.8	59.2
UKR - Ukraine	96	5	1972	1999	18.0	49.7
URY - Uruguay	77	33	1954	1995	30.7	42.5
VCT - St Vincent and Grenadines	99	21	1953	2003	24.9	78.5
VEN - Venezuela, RB	156	29	1959	2001	36.7	100.8
WSM - Samoa	109	13	1968	2005	25.2	71.8
YEM - Yemen, Rep	148	7	1968	1996	28.0	146.0
YUG - Yugoslavia	158	10	1957	1991	34.8	146.0
ZAF - South Africa	38	13	1953	1994	26.3	7.0
ZWE - Zimbabwe	151	18	1954	2002	36.5	94.4

Low income countries

Country code + name	Reported occs	Years with reports			Avg. reports by sample	
		Total	First	Last	45 occs	1983-08
AFG - Afghanistan	22	2	1958	1981	12.0	
BDI - Burundi	97	24	1963	1992	32.2	64.1
BEN - Benin	139	21	1956	1991	20.7	65.9
BFA - Burkina Faso	121	26	1956	2000	24.5	61.4
BGD - Bangladesh	150	35	1953	2007	32.7	88.2
CAF - Central African Republic	123	25	1956	1997	26.9	78.3
CHN - China	131	14	1990	2006	26.1	69.4
COD - Congo DR	150	10	1953	1983	36.7	146.0
COM - Comoros	108	15	1978	1999	18.9	73.8
EGY - Egypt, Arab Rep	141	11	1987	2000	25.6	85.4
ERI - Eritrea	123	3	1993	2000	33.3	91.7
ETH - Ethiopia	70	10	1955	1997	26.7	23.5
GHA - Ghana	152	24	1954	2007	34.6	97.3
GIN - Guinea	46	4	1956	1961	28.5	
GMB - Gambia	30	2	1983	1984	19.0	19.0
GNB - Guinea-Bissau	37	3	1977	1981	23.0	
GNQ - Equatorial Guinea	49	1	1985	1985	23.0	49.0
GUY - Guyana	135	41	1954	2007	22.5	61.5
HND - Honduras	151	32	1955	1997	34.6	109.5
HTI - Haiti	61	22	1953	1988	24.3	35.5
IDN - Indonesia	133	19	1959	2006	18.1	41.8
IND - India	103	42	1953	2008	23.1	63.6
KEN - Kenya	101	11	1957	1985	27.5	77.0
KHM - Cambodia	116	15	1962	2001	34.9	103.8
LAO - Lao PDR	13	1	1955	1955	13.0	
LBR - Liberia	68	7	1960	1986	21.8	26.5
LKA - Sri Lanka	64	40	1954	2000	13.2	24.1
LSO - Lesotho	122	5	1967	1990	28.0	97.0
MDG - Madagascar	159	19	1956	2005	33.8	103.1
MDV - Maldives	18	2	2007	2008	2.0	18.0
MLI - Mali	125	21	1956	1990	33.2	96.7
MMR - Myanmar	140	33	1970	2007	32.7	131.9
MOZ - Mozambique	145	3	1987	1989	32.7	115.7

MRT - Mauritania	36	9	1959	1971	18.3	
MWI - Malawi	138	18	1965	2002	20.2	59.3
NER - Niger	122	26	1956	1988	28.2	67.8
NGA - Nigeria	138	33	1953	1997	33.5	58.7
NPL - Nepal	117	7	1975	1990	32.9	68.5
PAK - Pakistan	159	32	1953	2004	40.0	108.7
RWA - Rwanda	131	12	1962	1991	33.1	123.9
SDN - Sudan	147	23	1953	1997	30.0	108.3
SLB - Solomon Islands	46	2	1964	1986	11.5	42.0
SLE - Sierra Leone	114	32	1954	1996	26.2	98.1
SOM - Somalia	44	5	1960	1979	25.2	
TCD - Chad	109	17	1956	1999	22.2	68.0
TGO - Togo	83	24	1959	1998	27.2	40.8
TJK - Tajikistan	114	3	1993	1996	14.7	44.3
TZA - Tanzania	41	19	1953	1983	26.2	10.0
UGA - Uganda	148	4	1954	1993	32.8	143.0
VNM - Vietnam	46	20	1955	1974	39.6	
ZMB - Zambia	152	34	1953	2006	30.4	98.3

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