

Appendix to "Economic freedom, human rights, and the returns to human capital : an evaluation of the Schultz hypothesis"

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Appendix A. Picking indicators

Developing indices has become a growth industry. The review by the Quality of Government Institute (Teorell and others 2009) lists 82 sources, most with multiple sub-indicators. The indexes are collected for different purposes and they measure different things. The indicators are quantitative, qualitative, objective, subjective, descriptive and abstract.

To narrow the set of indicators, we used the following criteria:

- a) The indicator is comprehensive in the number of countries included.
- b) The indicator uses comparable data across countries to insure comparability.
- c) The indicator has been used consistently over a long time period to insure comparability across years.
- d) The indicator is related to measures of individual freedom, whether in the economic, political or social realm. The best measures relates to whether individual choice is constrained such that the individual cannot make optimal choices of where to live, where to work, whether to open a business, whom to associate with, and what to produce or what to buy.
- e) The indicator is described sufficiently well so we know what it measures and be able to replicate the measure if necessary. This is particularly important should there be a need to interpolate or extrapolate beyond the available data.

Our selection was greatly aided by the data compilation made available by the Quality of Government Institute. Our included measures were:

Economic freedom: The Heritage Foundation Index of Economic Freedom is available from 1994-2006; we used the closest value to the year. The Index is the average of nine subindexes, each of which varies between 0 (least free) to 100 (most free):

- Business freedom: Ease of starting or closing a business
- Trade freedom: Levels of tariff and nontariff barriers
- Fiscal freedom: Marginal tax rates on personal and corporate income and total taxes as a fraction of GDP
- Freedom from government: State-owned enterprises and government expenditure as a share of GDP
- Monetary freedom: Inflation rates and the imposition of price controls
- Investment freedom: Quality of investment climate for both foreign and domestic investors
- Financial freedom: Regulations on banking and other financial institutions

- Property rights: Legislation and enforcement that protect individual property
- Freedom from corruption: Country's score on Transparency International's Corruption Perception Index.
- A Labor Freedom index was added recently, but we do not use it because of the lack of a long time series.

For five countries which were not covered in the Heritage Foundation Index, we use the fitted values from regressions of the index on the six measures included in the World Bank's Governance Indicators (Kaufmann, Kraay, and Mastruzzi 2008). The regression is summarized below

Source	SS	df	MS	Number of obs = 1225		
Model	148316.992	6	24719.4986	F(6, 1218)	=	700.39
Residual	42987.9642	1218	35.2938951	Prob > F	=	0.0000
				R-squared	=	0.7753
				Adj R-squared	=	0.7742
Total	191304.956	1224	156.294899	Root MSE	=	5.9409

Heritage index	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
Govt effectiveness	.87774	.734377	1.20	0.232	-.5630443	2.318524
Political stability	-.8918716	.3211919	-2.78	0.006	-1.522022	-.2617209
Rule of law	-1.174353	.7594392	-1.55	0.122	-2.664307	.3156008
Reg quality	13.4487	.5060047	26.58	0.000	12.45596	14.44144
Voice	-.4940371	.3542906	-1.39	0.163	-1.189125	.2010503
Limit Corruption	-.8815699	.647297	-1.36	0.173	-2.151511	.3883709
Constant	57.81686	.1796088	321.90	0.000	57.46448	58.16924

The Empowerment rights include a measure of worker rights to organize. Five countries were not covered by the Heritage Foundation Index. To correct for the missing data, we projected the Heritage Foundation measures on the six World Bank Governance Indicators: voice and accountability; political Stability; government effectiveness; regulatory quality; rule of law; and control of corruption (Kaufmann, Kraay, and Mastruzzi 2008).

Civil rights: The Empowerment Index from Cingranelli and Richards (2005) and the Human Rights Dataset (2005), available for years 1981-2004. For years later than 2004, we used the 2004 data. The Index has five subcomponents:

- Freedom of movement: Extent to which domestic or foreign travel is unrestricted
- Freedom of speech: Speech and the media are free from government censorship
- Worker's rights: Extent to which workers have the right to bargain collectively and internationally recognized worker rights are protected;
- Political participation: Extent to which political participation is free and open;
- Freedom of religion: Extent to which the government allows free religious practices.

Globalization index: Dreher's (2006) KOF Index of Globalization is available for most countries between 1970 and 2006. The index is a weighted average of Economic Globalization (based on trade and capital flows and restrictions on those flows); Political Globalization (participation in international organizations and embassies hosted); and Social Globalization (access to telephones, Internet, tourism and books within the country). We generated a predicted index for the 11 cases for which the overall index is missing, using a regression of the KOF

Index of Globalization on the Political Globalization subindex and the Heritage Foundation's Trade Freedom Index. The regression is

Source	SS	df	MS			
Model	228957.163	2	114478.581	Number of obs =	1819	
Residual	246319.69	1816	135.638596	F(2, 1816) =	844.00	
Total	475276.853	1818	261.428412	Prob > F =	0.0000	
				R-squared =	0.4817	
				Adj R-squared =	0.4812	
				Root MSE =	11.646	

Dreher Index	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
Dreher: _political						
globalization	.3816806	.0142872	26.71	0.000	.3536596	.4097017
Heritage Trade	.4722497	.0194161	24.32	0.000	.4341694	.5103299
Constant	3.185875	1.402216	2.27	0.023	.4357484	5.936001

Democracy. Freedom House reports an **Imputed Polity indicator** between 1972 and 2007 for all countries. The measure ranges from 0 to 10, with 0 being least democratic and 10 being most democratic.

Percent women in legislature. The **Inter-Parliamentary Union (IPU)** reports the percentage of women in the lower house of parliament for all countries between 1997 and 2008. Melander (2005) reports a similar series from 1965-2002 except that it is the percent of women in the upper house of parliament. To fill in the missing IPU data, we regress the IPU series on Melander's series for years when both observations were available, and then use the predicted IPU values to replace missing values where needed.

Source	SS	df	MS			
Model	36503.2988	1	36503.2988	Number of obs =	835	
Residual	28118.9683	833	33.7562645	F(1, 833) =	1081.38	
Total	64622.2671	834	77.4847328	Prob > F =	0.0000	
				R-squared =	0.5649	
				Adj R-squared =	0.5643	
				Root MSE =	5.81	

IPU	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
Melander	.7221616	.0219607	32.88	0.000	.6790569	.7652664
Constant	3.095549	.3404153	9.09	0.000	2.427376	3.763721

Note that for instrument validity, the F-test for exclusion should be over 10. For our imputations, the F-test varies from 700-1081.

Life expectancy at birth. The data are available from the **World Development Indicators**, for all countries and for various years between 1960 and 2006. When an exact match of dates is not available, we use interpolations of preceding and subsequent year's data.

Other data. **Real GDP per capita** and the **growth rate of real GDP per capita** come from the **United Nations Statistics Division's National Accounts**. **Real foreign aid per capita** is based on the **World Development Indicators Foreign Aid Series**. **Country population** obtained from the **United Nations Statistics Division's National Accounts**. The resulting series is converted into constant U.S. dollars using the U.S. Department of Commerce GDP deflator.

In Appendix Table A1, We present the sample statistics for the data used in the analysis.

In Appendix Table A2, we present the simple correlations between our estimated returns to schooling and returns estimated using the Heckman correction for selection referred to in footnote 19 in the main paper.

In the next section, we describe how we estimated the returns to education and experience using 122 microdata sets that provide the dependent variables used in the analysis.

Appendix B. Returns to education and experience

The estimated returns to education and experience used in the cross-country regressions are similar to those derived by Montenegro and Patrinos (2009). They use an earnings function where the natural logarithm of earnings (hourly, weekly, monthly, etc.) is a function of schooling and experience in the labor market. The specification they use is the following:

$$(1) \quad LnW_i = a + \beta_1 S_i + \beta_2 X_i + \beta_3 X_i^2 + \beta_4 DG_i + \sum_j \delta P_{ji} + \mu_i$$

where LnW is the natural log (of hourly or annual, depending on data) earnings for the i th individual; S_i is years of schooling (as a continuous variable); X_i is labor market experience (estimated as: $age_i - S_i - 6$); X_i^2 is experience-squared; DG_i is a dummy variable that takes the value 1 for females; $\sum_j \delta P_{ji}$ is a set of control dummy variables (P_j) to take into account the periodicity of the earnings; and μ_i is a random disturbance term reflecting unobserved abilities.

Therefore, β_1 can be viewed as the average rate of return to years of schooling and $\beta_2 - 2\beta_3 \bar{X}$ as the average rate of returns to years of experience.

Montenegro and Patrinos (2009) estimated this Mincerian specification equation for men and women jointly and separately, and also for urban versus rural. Their sample includes all workers 14-65 years of age with positive employment earnings, and positive labor market experience. Their estimates include all the countries with appropriate information that were available in the sample described in detail in Montenegro and Hirn (2008). Appendix Table B1 presents the Montenegro and Patrinos (2009) calculations

Our method differs from Montenegro and Patrinos in that we use age rather years of potential experience in the Mincerian earnings function. The reason is that there is substantial measurement error in years of schooling and highest grade attained, and so potential experience will be subject to measurement error. Therefore, our estimation applies age rather than potential experience in (1) as the measure of X_i . Our measure of returns to experience uses the average age in the population between 16 and 65 as the measure of \bar{X} . Our main results are in the paper. An alternate set of results using estimated returns to experience evaluated at a common mean world age are presented in Appendix tables C1 and C2. Results are very similar to those in the main paper.

Table A1: Sample statistics

Variable	Mean	Std. DEV
Returns to Education		
Total	8.09	3.51
Male	7.28	3.32
Female	9.74	3.79
Urban	8.29	3.68
Rural	7.50	4.04
Returns to Experience		
Total	1.51	1.04
Male	1.50	1.11
Female	1.52	1.12
Urban	1.76	1.18
Rural	1.18	0.98
Economic Freedom Index	55.25	10.81
Globalization Index	51.79	12.72
Empowerment rights index	6.14	2.76
Democracy (Freedom House/Imputed Polity)	6.26	2.74
Women in the Legislature	11.79	8.02
log(Life Expectancy at Birth)	4.15	0.17
log(GDP per Capita)	6.86	1.03
Growth Rate: GDP per Capita (%)	3.18	5.00
log(Aid per Capita)	-1.43	1.37

Appendix Table A2: Correlation between Selection Corrected and Least Squares Returns to Schooling

Selection Corrected estimates	Least squares estimates				
	Total	Male	Female	Urban	Rural
Total	0.92				
Male		0.85			
Female			0.91		
Urban				0.89	
Rural					0.89

Based on 90 observations of 122 possible

Appendix Table B1: Country household data sets used in the analysis including year, returns to education and experience for the total sample and by demographic group

cname	year	ccode	Estimated returns to a year of schooling				Estimated returns to age evaluated at the world average age					
			ALL	MALE	FEMALE	RURAL	ALL	MALE	FEMALE	RURAL		
			URBAN	URBAN	RURAL	URBAN	URBAN	RURAL	URBAN	RURAL		
Albania	2002	alb	4.01	3.11	6.43	5.36	1.03	-0.03	-0.23	0.46	0.24	-0.40
Albania	2005	alb	5.37	4.51	7.80	6.60	2.52	0.20	-0.31	1.04	0.66	-0.20
Argentina	1994	arg	7.95	7.76	8.42	7.95		1.85	1.76	1.65	1.85	
Argentina	2001	arg	3.13	2.98	3.38	3.13		2.15	2.28	1.84	2.15	
Armenia	1999	arm	1.71	0.78	2.58	1.74	0.71	0.63	0.23	0.79	0.65	0.60
Azerbaijan	1995	aze	5.12	4.41	6.75	3.40	7.39	0.57	0.14	0.91	1.02	0.29
Bahamas	2001	bhs	8.45	7.35	9.22	7.32	9.80	0.77	0.31	1.03	0.02	1.97
Bangladesh	2000	bgd	4.63	4.31	10.30	6.02	3.67	0.42	0.58	-0.48	1.08	0.19
Bangladesh	2005	bgd	3.60	3.04	6.59	3.81	3.17	1.01	1.26	0.57	1.59	0.80
Belize	1995	biz	9.83	8.37	12.40	8.75	9.84	1.41	1.37	1.54	0.33	1.71
Bolivia	2002	bol	6.15	5.33	7.52	6.50	4.06	1.95	1.90	1.97	2.09	1.25
Bolivia	2005	bol	6.86	6.18	8.07	7.25	4.88	1.98	1.73	2.27	2.04	1.46
Bosnia and Herzegov	2001	bih	8.45	6.60	11.92	10.19	7.60	-0.57	-0.90	-0.40	0.08	-0.88
Bulgaria	1995	bgr	5.27	5.08	5.45	5.53	3.91	0.67	0.57	0.76	0.81	0.10
Bulgaria	2001	bgr	3.42	3.15	3.66	3.29	3.90	0.88	0.93	0.73	1.09	0.20
Bulgaria	2003	bgr	7.64	7.71	7.58	8.15	5.65	1.00	0.71	1.25	1.12	0.74
Burkina Faso	2003	bfa	9.25	8.52	12.42	9.44	8.94	2.91	3.12	2.44	3.19	1.57
Burundi	1998	bdi	13.48	13.45	15.00	12.95	14.04	0.98	0.41	1.86	1.94	0.54
Cambodia	1997	khm	4.23	1.70	7.14	4.77	4.08	1.09	0.64	1.44	3.64	-0.06
Cambodia	2004	khm	4.92	3.29	6.97	3.80	5.81	-0.75	0.22	-1.59	-0.45	-0.86
Cameroon	2001	cmr	10.02	9.27	13.31	10.40	9.56	3.34	3.09	4.05	3.18	3.67
Cameroon	2007	cmr	7.65	7.30	9.27	8.25	5.15	2.49	2.28	3.03	2.61	2.06
Chad	2002	tcd	4.29	3.89	7.91	4.33	4.15	2.95	3.15	1.82	3.05	2.72
Chile	1990	chl	9.06	9.16	8.94	9.49	6.43	1.91	2.09	1.47	1.98	1.43
Chile	1996	chl	10.92	11.03	10.75	11.34	6.98	1.92	2.01	1.61	1.99	1.24
Chile	2003	chl	10.87	10.83	11.02	11.05	8.76	1.97	2.02	1.77	2.03	1.40
Chile	2006	chl	10.86	10.46	11.75	11.17	7.96	1.87	1.88	1.76	1.92	1.26
Colombia	1995	col	9.87	7.84	12.53	10.75	6.89	2.11	2.01	2.10	2.65	1.18

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Colombia	2000 col	9.09	8.04	10.54	9.37	8.64	2.29	2.20	2.28	2.36	2.10
Comoros	2004 com	4.98	3.97	8.64	5.93	3.94	1.55	1.56	1.81	1.18	1.54
Congo, Democratic F	2005 zar	2.14	1.52	4.82	7.22	-2.63	1.02	0.65	1.84	0.89	1.03
Costa Rica	1995 cri	8.61	7.74	10.29	8.89	8.10	1.23	1.25	0.98	1.59	0.90
Costa Rica	2001 cri	8.91	7.73	10.83	9.13	8.42	1.31	1.28	1.19	1.52	0.93
Cote d'Ivoire	2002 civ	8.16	7.80	9.79	7.90	9.16	3.10	2.56	4.36	3.66	1.90
Croatia	2004 hrv	8.64	7.78	9.54	8.93	8.06	1.05	1.08	0.92	1.18	0.84
Djibouti	1996 dji	9.83	8.52	12.37	9.89	6.70	2.90	3.10	3.04	2.92	2.60
Dominican Republic	1997 dom	6.58	5.70	7.77	6.93	5.55	1.19	1.14	1.11	1.42	0.67
Dominican Republic	2004 dom	8.52	7.57	9.52	8.98	7.15	2.02	2.18	1.67	2.13	1.62
Ecuador	1995 ecu	6.68	5.99	8.32	7.05	4.59	1.76	1.58	1.80	1.79	1.65
Egypt	1998 egypt	2.32	2.13	2.95	2.73	1.58	1.86	1.73	2.37	2.07	1.62
El Salvador	1995 slv	7.62	5.95	9.68	7.83	6.35	1.25	1.11	1.36	1.61	0.69
El Salvador	2002 slv	8.36	6.75	10.32	8.83	6.53	1.56	1.27	1.93	1.97	0.63
El Salvador	2005 slv	7.87	6.48	9.64	8.09	6.90	1.37	1.28	1.47	1.63	0.88
Ethiopia (-1992)	2005 eth	14.02	12.76	15.67	12.73	15.67	1.87	1.79	2.15	2.49	1.16
Gambia	1998 gmb	6.71	5.88	8.86	7.03	3.00	2.37	2.38	2.06	2.36	2.27
Ghana	1991 gha	4.63	3.40	6.70	5.90	3.82	2.42	2.66	2.00	2.82	2.41
Ghana	2005 gha	13.71	12.87	16.23	14.32	12.45	1.57	1.32	2.13	1.96	0.82
Guatemala	1989 gtm	10.06	8.46	13.10	10.26	9.29	1.34	1.22	1.40	1.78	0.87
Guatemala	2002 gtm	6.90	7.86	5.08	7.19	5.64	1.05	0.88	1.25	1.39	0.64
Guatemala	2006 gtm	9.48	8.82	10.70	9.83	8.35	1.27	1.25	1.07	1.46	0.92
Guyana	1992 guy	4.19	3.57	5.70	8.47	1.03	1.17	0.84	1.45	2.06	0.59
Haiti	2001 hti	8.11	6.38	10.89	5.42	18.59	5.59	5.87	4.49	6.64	2.48
Honduras	1995 hnd	9.10	8.16	10.85	8.68	9.47	1.21	1.12	1.29	1.53	1.01
Honduras	2003 hnd	6.22	5.96	6.16	5.72	6.99	0.97	0.62	1.58	1.43	0.33
Hungary	2004 hun	11.68	12.02	11.37	12.17	10.58	1.61	1.25	1.79	1.41	1.94
India	1999 ind	7.80	7.61	8.26	8.23	7.20	1.60	1.85	1.01	2.63	1.21
Indonesia	2002 idn	10.12	8.61	12.55	10.54	9.14	1.56	1.72	1.41	1.72	1.28
Iraq	2006 irq	1.83	1.43	5.97	2.06	1.43	1.01	0.44	3.41	1.51	-0.27
Jamaica	1996 jam	18.02	14.30	21.47	20.25	16.17	2.60	3.78	0.81	2.97	2.29
Jamaica	2002 jam	19.01	16.12	20.37	20.66	17.60	2.29	3.24	0.89	2.01	2.45

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Jordan	2002 jor	7.31	6.94	10.05	7.69	5.74	2.59	2.59	3.21	2.60	2.36
Kenya	2005 ken	12.16	11.43	13.76	12.91	11.61	2.64	2.33	3.24	3.01	2.42
Kyrgyzstan	1997 kgz	5.75	5.81	5.64	3.89	7.94	0.87	0.65	0.88	0.72	1.09
Latvia	2004 lva	7.25	6.44	7.94	7.25		-0.31	-0.47	-0.27	-0.31	
Macedonia	2005 mkd	5.58	4.78	6.78	6.50	3.54	0.37	0.18	0.61	0.61	-0.13
Madagascar	2001 mdg	8.35	7.93	8.88	8.70	7.94	1.44	1.81	1.06	1.97	1.03
Malawi	2005 mwi	10.86	10.45	12.66	16.22	7.71	2.28	2.34	1.77	2.92	2.02
Maldives	2004 mdv	3.37	2.46	5.31	5.10	1.76	0.19	0.07	0.55	0.09	0.35
Mauritania	2000 mrt	4.89	4.07	9.18	4.12	8.92	2.38	2.21	2.15	2.39	2.33
Mexico	1998 mex	10.13	9.46	11.47	10.27	8.28	1.99	2.03	1.74	2.12	1.30
Mexico	2006 mex	9.83	8.66	11.68	9.82	9.56	1.95	1.87	1.81	2.07	1.36
Micronesia	2000 fsm	10.38	10.49	10.09	10.38		2.59	2.44	2.82	2.59	
Moldova	2002 mda	6.71	6.62	6.82	6.00	8.63	-1.49	-1.36	-1.57	-2.14	-0.49
Moldova	2005 mda	6.57	6.33	6.79	6.01	7.42	-1.44	-1.58	-1.31	-1.00	-2.03
Mongolia	2002 mng	5.23	5.37	5.29	5.90	2.99	0.12	0.10	0.17	0.12	0.18
Morocco	1991 mar	6.94	6.17	9.79	7.30	2.81	1.59	1.29	2.23	2.14	1.00
Morocco	1998 mar	7.18	6.27	10.27	7.11	5.00	2.07	2.15	1.75	2.31	1.74
Mozambique	1996 moz	7.15	6.66	10.14	7.44	6.41	2.20	2.10	2.90	2.39	1.86
Nepal	2003 npl	5.15	4.88	6.98	0.82	6.30	0.02	0.44	-0.73	0.03	0.02
Nicaragua	1993 nic	10.47	12.29	7.90	9.06	14.19	0.82	1.69	-1.04	1.58	-0.37
Nicaragua	2001 nic	8.49	7.79	9.66	9.18	6.02	1.31	1.19	1.46	1.47	0.89
Niger	2002 ner	9.33	8.68	13.05	8.20	9.50	3.41	2.99	3.83	2.84	3.47
Nigeria	2003 nga	5.67	5.26	7.14	5.46	6.21	3.42	3.16	3.79	3.44	3.21
Pakistan (1972-)	1991 pak	11.00	10.77	13.58	10.30	11.56	1.80	2.04	0.28	2.88	1.10
Pakistan (1972-)	2001 pak	5.60	4.46	10.68	5.75	5.10	1.90	1.95	1.65	2.59	1.33
Paraguay	1995 pry	9.33	9.17	9.69	9.52	8.17	1.25	1.45	0.94	1.44	0.71
Paraguay	2001 pry	8.42	7.74	9.20	8.66	7.59	1.46	1.70	0.82	1.66	0.85
Peru	1994 per	7.37	6.44	9.26	7.30	7.48	2.06	2.02	1.84	2.15	1.70
Peru	2002 per	8.63	7.07	10.68	9.15	7.52	2.26	2.30	2.06	2.40	1.80
Philippines	1998 phi	13.08	10.37	17.17	12.68	13.65	1.66	1.76	1.37	1.54	1.83
Philippines	2002 phi	14.17	11.49	17.78	13.67	14.85	2.01	2.06	1.78	1.91	2.18
Romania	1994 rom	4.76	4.37	5.39	5.01	3.99	1.12	0.96	1.25	1.18	0.94

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Russian Federation	2003 rus	8.97	7.98	9.74	8.03	13.11	3.75	3.77	3.78	4.21	-0.33
Rwanda	1997 rwa	15.65	13.65	17.87	12.19	17.17	2.75	3.35	1.58	3.46	2.42
Rwanda	2005 rwa	15.24	14.41	16.62	17.44	12.97	1.95	2.45	1.36	2.50	1.63
Sao Tome and Princi	2000 stp	6.19	4.50	9.29	7.36	4.10	0.94	0.92	1.18	0.85	1.00
Serbia and Montene	2002 mne	5.79	4.47	7.27	5.79		-0.07	-0.12	0.00	-0.07	
Serbia and Montene	2006 mne	6.26	5.14	7.66	6.26		0.06	0.49	-0.30	0.06	
Sierra Leone	2003 sle	2.67	2.57	3.72	1.81	5.63	0.72	0.27	1.17	0.82	-0.67
Slovakia	2003 svk	9.18	8.81	9.41	10.68	9.08	1.35	1.13	1.49	0.82	1.38
South Africa	2000 zaf	14.67	12.53	17.43	16.11	11.77	2.82	2.75	2.85	2.64	3.29
Sri Lanka	2002 lka	9.54	9.06	10.25	9.86	9.44	0.76	0.93	0.45	1.24	0.69
Suriname	2001 sur	7.50	6.53	8.73	7.50		1.42	1.53	1.50	1.42	
Swaziland	2000 swz	11.16	9.64	14.24	11.54	10.71	3.00	3.42	2.53	3.83	2.19
Tajikistan	2003 tjk	4.51	3.18	6.61	3.64	5.21	0.89	0.80	0.94	0.46	0.91
Tanzania	2006 tza	14.67	13.67	17.12	13.30	15.85	3.11	2.68	3.84	3.48	2.76
Thailand	2002 tha	12.12	11.46	12.41	10.87	13.14	2.44	2.69	1.92	3.01	2.13
Thailand	2006 tha	9.41	8.93	9.73	9.35	9.35	2.19	2.21	2.04	2.51	1.91
Timor-Leste	2001 tmp	5.33	5.31	4.65	6.30	4.00	1.00	0.67	1.16	1.72	0.20
Tunisia	2001 tun	6.47	6.40	6.43	6.46	6.28	1.72	1.83	1.66	1.74	1.67
Turkey	2005 tur	7.95	7.22	10.30	8.01	7.53	1.70	1.88	1.07	1.82	1.27
Turkmenistan	1998 tkm	5.47	4.16	7.79	5.20	5.98	0.60	0.22	1.12	0.60	0.57
Uganda	1992 uga	7.19	6.96	7.59	7.91	6.51	0.51	0.23	1.20	0.85	0.25
Uganda	2002 uga	12.69	11.66	14.92	13.90	11.84	2.10	2.03	2.81	3.29	1.55
Uruguay	1995 ury	9.01	7.92	10.39	9.01		2.44	2.42	2.18	2.44	
Uruguay	2003 ury	12.32	10.46	14.49	12.32		3.16	3.20	2.86	3.16	
Uruguay	2006 ury	10.49	8.79	12.20	10.53	8.47	2.71	2.67	2.61	2.77	1.73
Venezuela	1995 ven	7.06	6.47	8.14	7.36	6.51	1.36	1.29	1.38	1.31	1.42
Vietnam	1992 vnm	-1.62	-1.88	-1.28	-1.00	-2.60	0.39	0.40	0.27	0.74	0.15
Vietnam	2002 vnm	5.34	4.35	6.76	5.10	5.33	0.86	0.88	0.84	1.48	0.57
Yemen	2005 yem	2.94	2.69	6.06	3.72	2.28	1.63	1.56	2.32	2.15	1.29
Zimbabwe	2003 zmb	16.88	16.33	18.56	17.79	14.46	2.18	1.78	2.71	2.46	1.35

Table C1: Cross-country weighted least squares regressions explaining variation in returns to schooling and returns to experience. Returns to experience are evaluated at the mean age between 16 and 65 in the developing countries included in the analysis which is 34.3. (corresponds to table 1 in the text)

	Total		Male		Female		Urban		Rural	
	<i>Ed:τ_{jt}</i>	<i>Exp:b_{jt}</i>								
Economic Freedom Index	0.081** (2.287)	0.018** (2.129)	0.072* (1.859)	0.017* (1.752)	0.102** (2.322)	0.015 (1.235)	0.097** (2.575)	0.021* (1.884)	-0.019 (-0.497)	0.000 (0.021)
index_global	-0.015 (-0.369)	0.006 (0.714)	-0.001 (-0.019)	0.004 (0.509)	-0.068 (-1.577)	0.009 (0.821)	-0.043 (-1.015)	-0.008 (-0.839)	0.053 (1.433)	0.012 (1.610)
Empowerment rights index	-0.029 (-0.144)	-0.022 (-0.767)	-0.014 (-0.075)	-0.039 (-1.286)	-0.144 (-0.573)	-0.020 (-0.506)	-0.085 (-0.424)	-0.029 (-0.897)	0.236 (1.283)	0.011 (0.339)
Democracy (Freedom House/Imputed Polity)	0.321* (1.888)	0.003 (0.065)	0.351** (2.045)	0.020 (0.442)	0.332* (1.894)	-0.027 (-0.592)	0.361** (1.992)	-0.001 (-0.009)	0.068 (0.483)	-0.022 (-0.573)
women_par	0.107* (1.769)	-0.004 (-0.417)	0.065 (1.227)	-0.007 (-0.596)	0.148* (1.855)	0.004 (0.346)	0.137** (2.103)	0.000 (0.046)	0.031 (0.622)	-0.000 (-0.012)
_cons	1.386 (1.006)	0.449 (1.014)	0.502 (0.371)	0.662 (1.370)	4.808** (2.103)	0.447 (0.824)	2.050 (1.399)	1.391** (2.190)	3.444** (2.420)	0.642** (2.173)
R2	0.263	0.137	0.317	0.125	0.165	0.088	0.277	0.046	0.152	0.061
Number of observations	122	122	122	122	122	122	122	122	113	113

note: *** p<0.01, ** p<0.05, * p<0.1

Table C2: Cross-country weighted least squares regressions with added controls explaining variation in returns to schooling and returns to experience. Returns to experience are evaluated at the mean age between 16 and 65 in the developing countries included in the analysis which is 34.3. (corresponds top table 5 in the text)

	Total		Male		Female		Urban		Rural	
	<i>Ed:r_{jt}</i>	<i>Exp:b_{jt}</i>								
Economic Freedom Index	0.116*** (3.398)	0.020** (2.543)	0.117*** (3.074)	0.021** (2.510)	0.113*** (2.881)	0.014 (1.504)	0.127*** (3.501)	0.022*** (2.639)	0.007 (0.219)	0.007 (0.990)
index_global	0.096** (1.967)	0.006 (0.604)	0.078 (1.565)	0.007 (0.612)	0.089** (1.995)	0.008 (0.685)	0.068 (1.571)	-0.001 (-0.060)	0.170*** (2.886)	0.020* (1.905)
Empowerment rights index	0.034 (0.205)	-0.018 (-0.511)	0.061 (0.422)	-0.028 (-0.815)	-0.056 (-0.249)	-0.018 (-0.351)	0.015 (0.093)	-0.015 (-0.433)	0.220 (1.261)	0.020 (0.815)
Democracy (Freedom House/Imputed Polity)	0.359*** (3.268)	0.011 (0.233)	0.309*** (2.607)	0.017 (0.356)	0.499*** (3.428)	-0.001 (-0.020)	0.391*** (3.818)	0.026 (0.515)	0.084 (0.653)	-0.045 (-1.509)
women_par	0.050 (1.298)	-0.006 (-0.584)	0.019 (0.471)	-0.008 (-0.720)	0.070 (1.644)	-0.001 (-0.115)	0.056 (1.467)	-0.005 (-0.412)	0.017 (0.349)	-0.005 (-0.730)
Log of Life Expectancy at Birth, Total (Years)	-13.522*** (-5.898)	-3.044*** (-4.857)	-13.239*** (-5.121)	-2.877*** (-4.607)	-14.674*** (-6.202)	-3.097*** (-3.426)	-14.180*** (-5.934)	-3.034*** (-3.476)	-9.817*** (-3.272)	-3.750*** (-5.906)
Log of real GDP per capita	-0.832 (-1.039)	0.268** (2.088)	-0.545 (-0.754)	0.226 (1.630)	-1.190 (-1.179)	0.313** (2.117)	-0.899 (-1.035)	0.172 (1.250)	-0.712 (-0.926)	0.203 (1.280)
Growth Rate of Real GDP per Capita (%)	0.069 (0.650)	0.002 (0.161)	0.090 (0.974)	-0.001 (-0.051)	0.058 (0.469)	0.032 (1.295)	0.074 (0.698)	0.018 (1.621)	-0.136 (-1.330)	-0.030 (-1.136)
Log of real aid per capita	-0.386 (-1.431)	-0.138 (-1.363)	-0.350 (-1.302)	-0.144 (-1.393)	-0.409 (-1.259)	-0.097 (-0.976)	-0.440 (-1.541)	-0.183* (-1.868)	-0.280 (-1.105)	-0.093 (-1.353)
lpop	-0.030 (-0.103)	-0.040 (-0.340)	0.019 (0.079)	-0.003 (-0.024)	0.018 (0.042)	-0.088 (-0.755)	-0.087 (-0.294)	-0.061 (-0.501)	0.243 (0.817)	0.060 (0.845)
% of people in the labor force with more than 8 years of schooling	0.002 (0.128)	-0.005 (-1.070)	0.015 (0.871)	-0.005 (-0.984)	-0.015 (-0.801)	-0.008 (-1.244)	0.012 (0.727)	-0.010 (-1.485)	-0.009 (-0.449)	0.001 (0.391)
_cons	55.370***	11.782***	51.288***	10.664***	64.189***	12.762***	60.051***	13.255***	37.901***	13.129***

R2	(4.393)	(3.922)	(3.910)	(3.418)	(4.712)	(3.241)	(4.973)	(3.672)	(2.599)	(4.185)
	0.462	0.368	0.493	0.358	0.419	0.297	0.482	0.339	0.359	0.409
Number of observations	122	122	122	122	122	122	122	122	113	113

note: *** p<0.01, ** p<0.05, * p<0.1

Appendix D. An illustrative model of matching and returns to human capital

This section presents one example of how freer economic institutions can raise returns to human capital. We turn to a variation of the Pissarides (2000) model of two-sided labor market search to show how more flexible market institutions, reflected in a more efficient mechanism matching firms to workers, raises returns to human capital. Other models can yield a similar prediction. For example, Murphy et al (1991) show that strong property rights, ease of firm entry, and larger markets will cause the most able to become entrepreneurs, simultaneously increasing overall growth and returns to skill. Rosen(1983) demonstrates that returns to specialized applications of skill to an activity increase as transaction costs fall and the size of the market increases. The common feature in these models is that more efficient gains from trade among agents create increasing returns to skill.

Let $q(\theta)$ be a matching function that defines the rate at which a vacant job is matched to an available unemployed worker. θ is a measure of labor market tightness: the ratio of job vacancies to unemployed workers. As θ gets larger, the number of vacancies rises relative to the number of unemployed available to fill the jobs. The probability that a given vacancy is filled falls as θ increases, and so $q'(\theta) < 0$. Job seekers of equal ability are randomly assigned to vacancies for which they qualify. The expected duration of a job remaining vacant is $1/q(\theta)$, and so jobs stay unfilled longer when the matching process is inefficient. In our framework, better market institutions would raise $q(\theta)$ at the same level of θ , and so good institutions yield matches faster at any given level of labor market tightness. In essence, the unemployed are sorted into available vacancies more efficiently, workers waste less time searching and more time working, and the overall level of production in the economy rises.

Job seekers are sorted into groups based on their exogenously given abilities, H . Each firm can only hire one worker and so jobs and firms are synonymous. Job vacancies and job seekers are indexed by a required minimum level of H . That level of human capital also defines the value of output produced by the firm. The firm faces a cost in filling a vacant job equal to cH , $c < 1$, and so it is more expensive to fill jobs requiring greater skill.

Job Creation

A firm decides to create a job vacancy if it can do so profitably, and so in competitive markets, the expected profit from an additional vacancy must be zero. Let J be the present value from a filled job and V be the present value of an unfilled vacancy evaluated at the interest rate r . The zero expected profit condition requires that:

$$(1) \quad rV = -cH + q(\theta)(J - V)$$

so that the stream of earnings expected from a vacancy is equal to the probability of filling the vacancy times the added return from a filled job net of the search costs. Competitive forces will drive V to zero, and so in equilibrium,

$$(2) \quad J = \frac{cH}{q(\theta)}.$$

A filled job generates a stream of earnings such that:

$$(3) \quad rJ = H - w - \lambda J$$

So that the value of the job reflects the value of output net of the wage, w , minus the expected loss of future revenue if the job disappears. The parameter λ is the random probability that the firm experiences an adverse shock large enough to drive the firm out of business. These shocks could be due to a loss of productivity or to taste shifts that lower the value of output. Inserting (2) into (3) and rearranging yields what Pissarides calls the job creation condition:

$$(4) \quad w = H - \frac{(r+\lambda)cH}{q(\theta)}$$

which is similar to a standard derived demand for labor, save that the firm sets the wage equal to the value of the marginal product net of the expected hiring costs. Lower frictions in hiring as measured by a high value of $q(\theta)$ will increase the firm's pay offers. Economic or political institutions that make matching less efficient will lower firm demands for labor.

Wage Determination

Just as firms decide whether or not to offer a job vacancy, workers will decide whether to enter the labor market. Individuals have a value of time outside the labor market, $z = \rho w$ which we assume is proportional to the market wage. The parameter may reflect the nonmarket uses of time or it may be a policy parameter such as an unemployment insurance benefit which ties earnings outside the labor market to what can be earned while employed. If W and U are respectively, the present values of being employed and being unemployed, then the stream of returns from a job will be:

$$(5) \quad rW = w - \lambda(W - U),$$

where the returns include the probability of job loss in the event of an adverse shock. The stream of returns to unemployment will be:

$$(6) \quad rU = \rho w + \theta q(\theta)(W - U),$$

where $\theta q(\theta)$ turns out to be the rate of job entry from unemployment to employment.

The firm and the worker set the wage so as to maximize their weighted net return from the match. The worker's gain is $(W - U)$ and the firm's gain is $(J - V)$. The joint net gain from the match is $(W - U + J - V)$. The worker's share of the gain is defined as ψ . Therefore the net gain to the worker is:

$$(7) \quad W - U = \psi(W - U + J - V)$$

Substituting in (2), (5) and the requirement that $V=0$ in equilibrium yields an equilibrium wage $w = (1 - \psi)rU + \psi H$. Inserting (2) and the requirement that $V=0$ into (7) allows us to derive a term for $(W - U)$ which when inserted into (6) generates $rU = \rho w + \theta \frac{\psi}{1-\psi} cH$.

Substituting this into the wage equation and rearranging yields the wage equation:

$$(8) \quad w = \frac{\psi H(1+\theta c)}{1-(1-\psi)\rho}$$

Equilibrium

Equations (4) and (8) provide two equations in two unknowns, w and θ .¹ The job creation equation (4) is downward sloping in market tightness, θ , and the wage equation (8) is upward sloping in θ . The two equations generate unique equilibrium values of w and θ , as illustrated in Figure 1A. Inserting (8) into (4) yields an implicit function in θ :

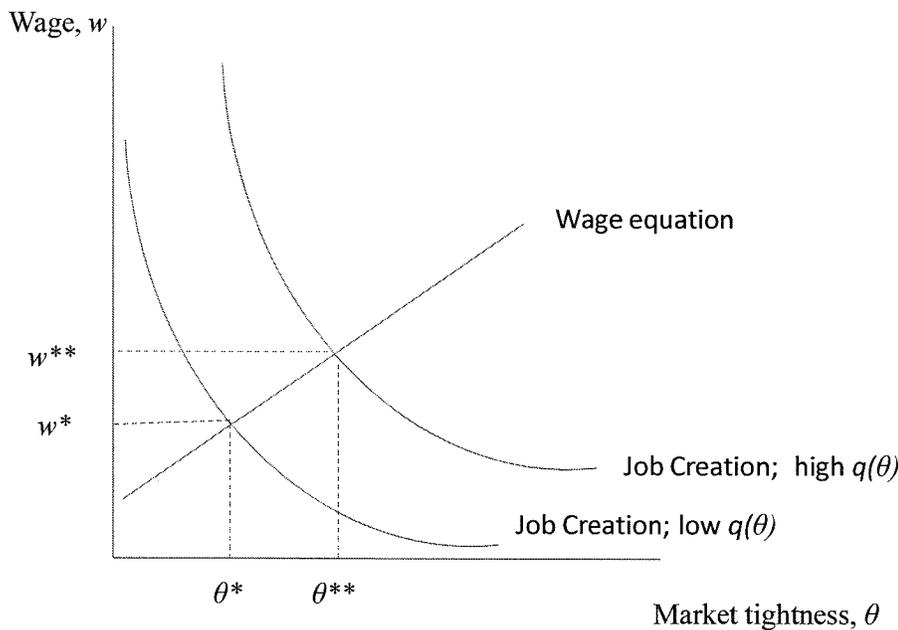
$$(9) \quad 1 - \frac{\psi(1+c\theta)}{1-(1-\psi)\rho} - \frac{(r+\lambda)c}{q(\theta)} = 0$$

Equation (9) implies that the equilibrium value for θ is fixed by $\theta^*(r, \lambda, c, \psi, \rho)$ which is independent of skill. Therefore, the degree of job market tightness does not depend on the distribution of skills in the economy. Instead, equilibrium job market tightness θ^* decreases at higher interest rates, exposure to adverse shocks, higher search costs, higher value of nonmarket time, and higher labor share of match rents.

¹ In the Pissarides (2000) formulation, a third equation fixes the unemployment rate, but it turns out that when nonmarket time is proportional to the market wage, unemployment does not enter either the equilibrium job creation or the wage equations.

Countries with better matching mechanisms, say from institutions that improve information flows in the economy, will have higher values of $q(\theta^*)$ at any level of labor market tightness, θ^* . This shifts the job creation curve outward, but it does not affect the wage equation.² As shown in Figure 1A, the outward shift in job creation caused by a more efficient match mechanism raises both equilibrium wage and market tightness. Because the outward shift in the job creation curve is larger for workers with greater skill, the most skilled benefit most from better matching mechanisms in the labor market. If education or on-the-job training are positively correlated with the exogenous skill H , then we will observe higher returns to education or experience in economies with institutions that generate better matching mechanisms.

Figure 1A: Equilibrium wages and market tightness



Job Creation: $w = H - \frac{(\tau + \lambda)cH}{q(\theta)}$

Wage equation: $w = \frac{\psi H(1 + \theta c)}{1 - (1 - \psi)\rho}$

² It turns out that in markets with more efficient match mechanisms, filled jobs generate lower rents even as they increase the speed at which vacancies are filled, and so the worker's present value of time spent searching does not vary with $q(\theta^*)$. As a result, worker incentives to accept wages are unaffected by $q(\theta^*)$.

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