Appendix A

This section presents details of key stylised facts.

Table 5: Stylised facts for 11 OECD countries

Country	IEE	Assortative Matching	Log P90/P10	Tax Progr. Wedge	Average Tax
Denmark	0.15	0.36	0.87	0.3	0.3
Norway	0.17	0.48	0.73	0.21	0.21
Finland	0.18	0.43	0.89	0.28	0.25
Canada	0.19	0.43	1.3	0.23	0.16
Sweden	0.27	0.48	0.7	0.27	0.24
Germany	0.32	0.44	1.12	0.26	0.19
Spain	0.4	0.6	1.23	0.19	0.12
France	0.41	0.56	1.07	0.18	0.13
Italy	0.43	0.64	0.87	0.22	0.17
U.S.	0.47	0.61	1.55	0.17	0.16
U.K.	0.5	0.52	1.26	0.24	0.17

Table 6: Stylised facts. Correlation matrix

	IEE	Assort. Matching	Log P90/P10	Tax Progressivity	Avg. Tax
IEE	1				
Assort. Matching	0.82	1			
Log P90/P10	0.563	0.334	1		
Tax Progressivity	-0.599	-0.806	-0.498	1	
Avg. Tax	-0.703	-0.754	-0.624	0.846	1

Appendix B

Proof of Proposition 1. Denote b_{t-1} as a level of b determined at the iteration $t-1$ and taken as given by agents at the beginning of iteration t. The level of b_{t-1} determines government spending on education subsidies through the number of married couples. Then by plugging in the government budget constraint, we can rewrite equality (*) as a difference equation of the following form

$$b_t = f(b_{t-1}) - \beta log(y_h + y_l) + \beta V(h),$$

$f(b_{t-1}) = log\big(y_h + t_l - [1 - \frac{1}{2}F(b_{t-1})]gn\big) - log\big(\frac{y_l + y_h + \frac{1}{2}F(b_{t-1})gn}{1+\alpha\psi}\big) - \alpha log\big(A\big(\alpha\psi\frac{y_h + y_l + \frac{1}{2}F(b_{t-1})gn}{n(1+\alpha\psi)}\big)^{\psi}\big)$.
A fixed point solution b^* of a given equation is stable if $|f_b'(b^*)| < 1$. Applying an implicit differentiation rule obtain:

$$\frac{db^*}{d(-t_l)} = \frac{-1}{\big(1 - f_b'(b^*)\big)\big(y_h + y_l + \frac{1}{2}F(b^*)gn\big)} < 0$$

Given fixed point stability conditions, $1 - f_b'(b^*) > 0$. Therefore, the RHS of the equation above is negative and a higher net transfer to low productive individuals leads to lower b^*.

Proof of Proposition 2. Assume tax progressivity captured by the parameter a is fixed, $t_l = t$, $t_h = at$. As in the proof of proposition 1 above, applying implicit differentiation obtains:

$$\frac{db^*}{dg} = \frac{-1}{1 - f_b'(b^*)}\big(\frac{(1+\alpha\psi)nF(b^*)}{2(y_h + y_l + \frac{1}{2}F(b^*)gn)} + \frac{a(1 - \frac{1}{2}F(b^*))n}{(1+a)y_h - a(1 - \frac{1}{2}F(b^*))gn}\big) < 0.$$

If, instead, more generous education subsidies are financed by higher levels of the tax for high productive individuals, then the equation above modifies to:

$$\frac{db^*}{dg} = \frac{-1}{1 - f_b'(b^*)}\big(\frac{(1+\alpha\psi)nF(b^*)}{2(y_h + y_l + \frac{1}{2}F(b^*)gn)} + \frac{(1 - \frac{1}{2}F(b^*))n}{y_h + t_l - (1 - \frac{1}{2}F(b^*))gn}\big) < 0.$$

Therefore, a negative relationship between education subsidies and b^* is preserved.

Appendix C

This section presents details of the model calibration and results.

Table 7: Country tax functions, from Holter (2015)

	Married, 2 children				**Married, no children**				**Single**			
	τ_1	τ_2	τ_3	τ_4	τ_1	τ_2	τ_3	τ_4	τ_1	τ_2	τ_3	τ_4
DK	-2.737	6.483	-4.329	0.932	-0.834	2.654	-1.782	0.373	-1.852	4.995	-3.492	0.775
NO	-0.915	2.357	-1.436	0.277	-0.915	2.357	-1.436	0.277	-0.919	2.453	-1.512	0.289
FI	-0.834	2.654	-1.782	0.373	-0.834	2.654	-1.782	0.373	-2.315	5.579	-3.776	0.827
CA	-3.044	6.513	-4.211	0.893	-1.005	2.384	-1.468	0.294	-0.306	0.806	-0.255	-0.015
SE	-1.899	4.382	-2.787	0.573	0.044	0.256	0.117	-0.102	-0.862	2.485	-1.602	0.322
DE	-2.832	6.707	-4.575	1.004	-2.342	6.033	-4.321	0.989	-1.279	3.924	-2.909	0.672
ES	-0.854	1.800	-0.944	0.156	-0.695	1.483	-0.725	0.105	-0.746	1.710	-0.925	0.156
FR	0.145	-0.226	0.483	-0.174	-0.066	0.523	-0.244	0.037	-0.640	1.996	-1.385	0.315
IT	-2.973	6.547	-4.289	0.916	-2.199	5.172	-3.501	0.771	-2.339	5.629	-3.884	0.867
US.	-1.513	3.474	-2.235	0.470	-0.595	1.637	-1.008	0.197	-1.183	3.181	-2.253	0.513
UK.	-3.387	7.400	-4.917	1.067	-1.752	4.313	-3.017	0.684	-1.816	4.587	-3.269	0.752

Table 8: Country federal and state expenditures per student, % of GDP per capita

Country	Primary	Secondary	Tertiary
Denmark	9.94	13.86	55.8
Norway	10.49	14.46	44.18
Finland	7.75	12.15	34.84
Canada	13.3	13.84	38.34
Sweden	-	-	-
Germany	13.92	18.7	36.75
Spain	17.71	21.58	23.78
France	15.63	24.29	34.89
Italy	19.33	21.38	23.87
U.S.	10.1	11.4	20.9
U.K.	5.34	6.53	23.3

Table 9: Data sources for endogenously calibrated parameters targets

Target	Source
University attendance ratio; university drop out rate	Census Bureau, 2000-2005
Private spending, prior-university and university	UNESCO & OECD, 2000-2005
University premium; log 90 to 10 ratio	OECD, Education at a Glance
Share of young married agents; degree of assortative matching	LIS 96-00
Share of h.c. in earnings variance; IEE	Hugget et. al. (2011); Corak (2006)

Table 10: Model results. Correlation matrix

	IEE	Assort. Matching	Log P90/P10	Tax Progressivity	Avg. Tax
IEE	1				
Assort. Matching	0.814	1			
Log P90/P10	0.862	0.687	1		
Tax Progressivity	-0.64	-0.205	-0.502	1	
Avg. Tax	-0.68	-0.242	-0.488	0.846	1

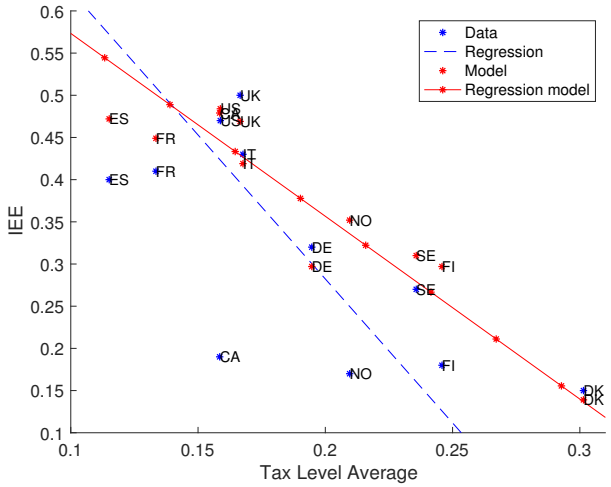
Table 11: Model without a marriage market. Endogenously calibrated parameters

Parameter	Value	Description	Target
h_{min}	1.55	Minimum level of human capital	University attendance ratio
ϕ_0	0.535	Human capital production, before university	Private spending, prior-university
ϕ_1	0.6	Human capital production, in university	University premium
γ	0.219	Parental altruism	Private spending, university
θ	-0.199	Parameter affecting university failure	University drop out rate
σ_a	0.315	Std. of ability shock	Share of h.c. in earnings variance
ρ_a	0.185	Autocorrelation parameter of ability shock	Intergenerational earnings persistence
σ_z	0.389	Std. deviation of labor market luck shock	Log 90 to 10 ratio

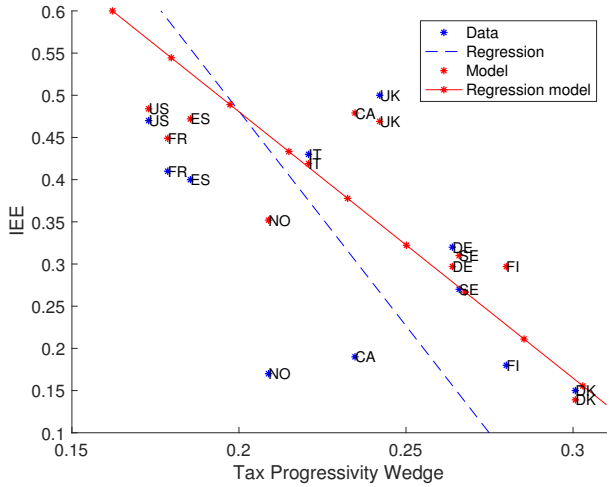
Table 12: Model without a marriage market. Calibrated parameters and fit

Target	U.S.	Model w/o marriage market
University attendance ratio	0.530	0.536
Share of private spending, primary and secondary education	0.493	0.491
University premium	1.75	1.749
Share of private spending, university education	0.631	0.616
University drop out rate	0.321	0.327
Share of h.c. in earnings variance	0.615	0.616
Earnings persistence	0.470	0.475
Log 90 to 10 ratio	1.545	1.552

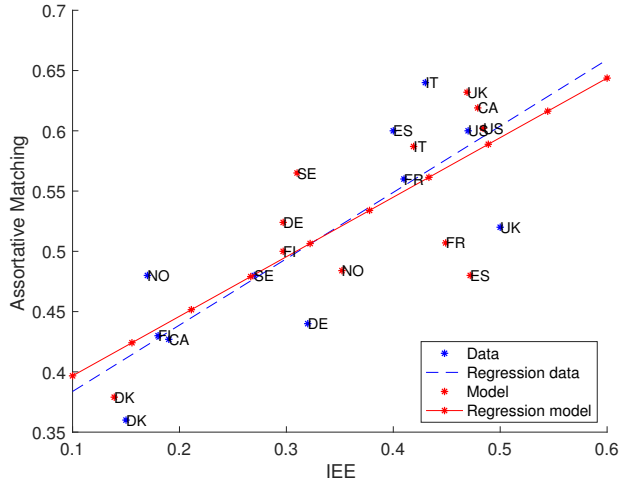
Figure 4: Model performance explaining stylized facts. Only taxes



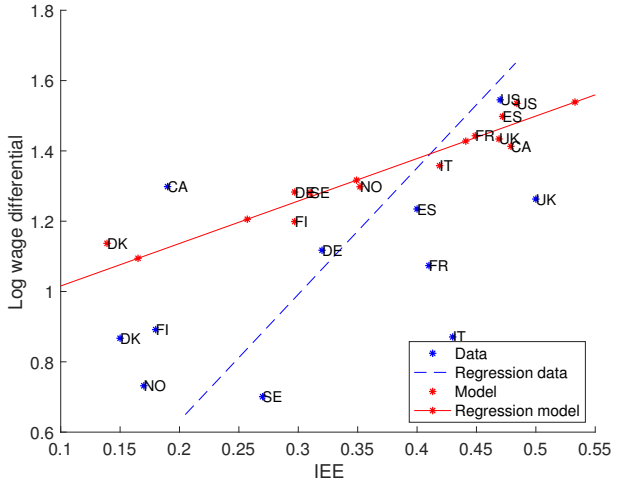
A: Tax level average vs. IEE



B: Tax progressivity wedge vs. IEE

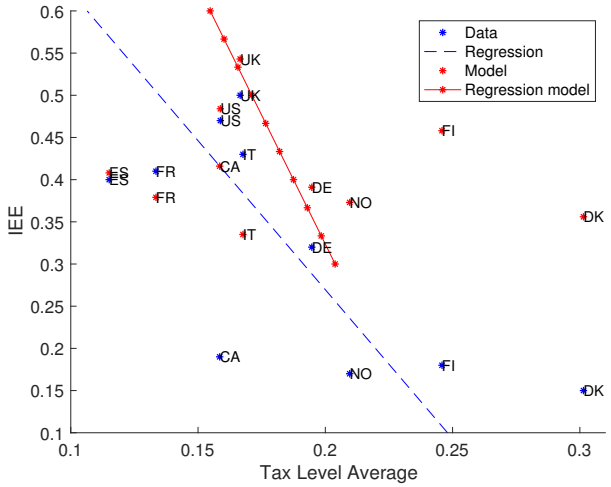


C: Assortative matching vs. IEE

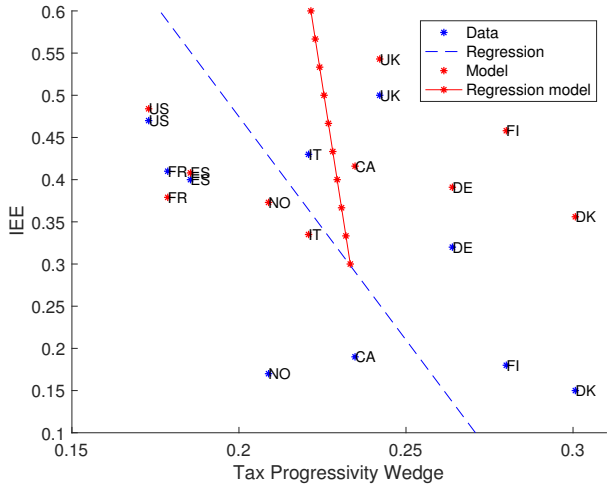


D: Log wage differential vs. IEE

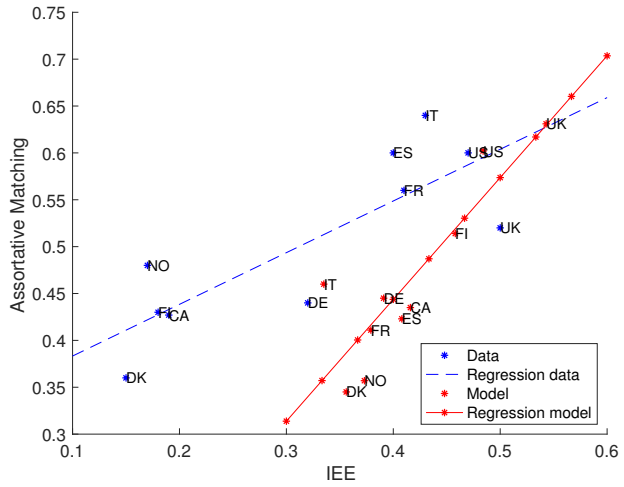
Figure 5: Model performance explaining stylized facts. Only subsidies



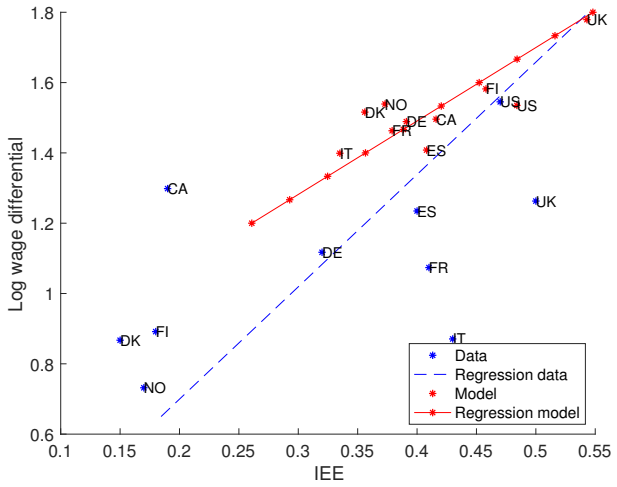
A: Tax level average vs. IEE



B: Tax progressivity wedge vs. IEE



C: Assortative matching vs. IEE



D: Log wage differential vs. IEE