Wage Inequality under Real Competition
A Classical Model of Ever-Renewed Inequalities and the Shape of the Wage Curve

Patrick Mokre
@patrickmokre | patrick.mokre@akwien.at | www.patrickmokre.com

Economics Department, Austrian Federal Chamber of Labor

Research Institute for Inequality Studies INEQ, Vienna University of Economics and Business

Outline

1 Firm competition induce wage inequality. Simultaneous equalization and diffusion give a stable wage distribution.

2 Both Smith and Marx describe economic models of turbulent wage dynamics in their work.

3 Stochastically, turbulent growth processes can produce stable cross-sectional distributions, and a good fit to actual wage inequality.

4 The relationship between order and disorder is not merely statistical but grounded in CPE literature.

The Wage Curve

Where does the form of the wage curve come from?
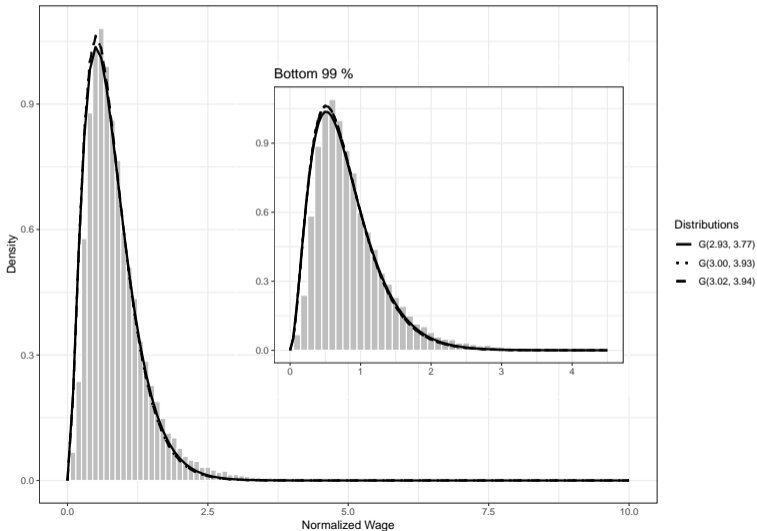
Wage Inequality in Classical Political Economics (CPE)

1 The cost of reproducing the skills necessary for a certain kind of labor.

2 Conflictive bargaining, with collusion and the reservere army at the center.

3 Turbulent dynamics of labor mobility and wage growth, induced by firm competition.

Processes of simultaneous equalization and dispersion are called **turbulent**. When turbulent growth processes are **coherent** they can be subjected to **statistical analysis** and a **cross-sectional distribution of levels** can be derived.

Smith on Turbulent Wage Dynamics

*"Where all other circumstances are equal, wages are generally higher in new than in old trades. When a projector attempts to establish a new manufacture, he must at first entice his workmen from other employments by higher wages than they can either earn in their own trades, or than the nature of his work would otherwise require, and a considerable time must pass away before he can venture to **reduce them to the common level**." (Smith 1999 [Wealth of Nations], 163)*

► This is a simple **turbulent model**: First "new trades" increase wages above the common rate (create inequality), later return to it (equalize).

► This happens repeatedly: competition pushes ubiquitous innovation, new firms and technologies.

*"This **constant equalization of ever-renewed inequalities** is accomplished more quickly (1) the more mobile capital is, i.e. the more easily it can be transferred from one sphere and one place to others; (2) the more rapidly labour-power can be moved from one sphere to another and from one local point of production to another."* (Marx 1993 [Capital Volume 3], 298)

► Marx notes the **transmission mechanisms** in a simple turbulent model, **capital and labor mobility**.

Marx on generalized competition

> *"Competition is the real development of capital. By its means, what corresponds to the nature of capital is posited as external necessity for the individual capital; what corresponds to the concept of capital, is posited as external necessity for the mode of production founded on capital. The **reciprocal compulsion** which the capitals within it practise upon one another, on labour etc. (**the competition among workers is only another form of the competition among capitals**), is the free, at the same time the real development of wealth as capital."* (Marx 1993 [Grundrisse], 650)

▶ Details of capitalist competition become generally fundamental, because in capitalism, dynamics of capital accumulation are general.

Real Economic Analysis

"*From this point of view, systemic patterns are generated in and through continual fluctuations: disorder is the operative mechanism of order.*" (Shaikh 2014, in: Szenberg and Ramrattan 2014)

In summary, Smith and Marx add turbulent competition dynamics as a third factor in wage inequality.

The first two are cost of skill reproduction and conflictive bargaining.

Botwinick and Mokre/Rehm on Bargaining under Real Competition

Limits to Wage Increases combine turbulent and persistently different factors.

- ▶ Absolute profitability (industry level): $r^* \times \left(\frac{K}{L}\right)$.
- ▶ Cost differentials between regulating and subdominant capital: $\frac{(k^* - k^s)/l^*}{k^*/l^*} \propto \frac{k}{l}$.
- ▶ Further diffusion by firing and hiring. Job loss and re-employment **de-skills and depresses wages**, employment in new investment **offers higher wages**.
- ▶ Regulating profit rate attracts investment, thereby employment, thereby higher wage offers.

Example of two industries

- ▶ **Basic goods** industry (BGI) has low capital intensity, low total-to-labor cost rate, vice versa in **luxury goods industry** (LGI).
- ▶ Period 1: Regulating capital in LGI realizes high profits on new capital, at big distance to competition.
- ▶ Period 2: BGI capitalists invest period 1 profits in LGI. Supply, competition and employment increases.
- ▶ Period 2: Due to higher profit rates and high cost distance, LGI workers make big wage gains.
- ▶ Period 3: Thanks to high supply and competitive price-cutting, profit rates in LGI decrease.
- ▶ Period 3: Due to less competition and supply, BGI capitals increase prices, realize higher regulating rate of profit.
- ▶ Period 3: BGI workers gain higher wage increases than in Period 2. However, as capital intensity and total cost-labor cost ratio are lower, the gains are smaller than LGI's Period 2 gains.
- ▶ Turbulent equalization (alternating above- and below-average gains) with differential attractor points form an **unequal but stable-form distribution**

Statistical Model (Drift-Diffusion Equation)

$$dX = \theta(\mu - X)dt + \sigma\sqrt{X}dW_t \tag{1}$$

$$X \sim Gamma(\alpha, \beta) = Gamma(\mu\frac{2\theta}{\sigma^2}, \frac{2\theta}{\sigma^2}) \tag{2}$$

- ▶ $\theta(\mu - X) + \sigma\sqrt{X}dWt \rightarrow X \sim Gamma(\mu\frac{2\theta}{\sigma^2}, \frac{2\theta}{\sigma^2})$
- ▶ $\theta(\mu - X)$ mean reverting process, eg. faster capital turnover → **faster equalization**
- ▶ $\sigma\sqrt{X_t}dW_t$ diffusion by Wiener process, eg. economic boom → **higher labor mobility**

Table 1: Soofi IID and RMSD goodness-of-fit comparison of workhorse and hierarchical drift-diffusion models.

Model	α	β	Mean $\hat{R}$	Soofi IID	Rank Soofi	RMSD	Rank RMSD
θ, σ	2.38	3.05	1.00	0.14	1	0.0020	1
θ, σ_T	1.99	2.60	1.00	0.16	2	0.0021	2
θ_I, σ	1.96	2.57	1.00	0.16	3	0.0022	3
θ_T, σ	1.88	2.48	1.00	0.17	4	0.0022	4
θ, σ_I	1.72	2.21	1.01	0.17	5	0.0023	5
θ_T, σ_T	1.71	2.20	1.00	0.17	6	0.0023	6
θ_T, σ_I	1.27	1.63	1.01	0.22	7	0.0026	7
θ_I, σ_I	1.22	1.59	1.03	0.24	8	0.0026	8
θ_I, σ_T	1.02	1.34	1.02	0.28	9	0.0028	9

Table 2: Soofi IID and RMSD goodness-of-fit comparison of workhorse and hierarchical drift-diffusion models.

Model	α	β	Mean $\hat{R}$	Soofi IID	Rank Soofi	RMSD	Rank RMSD
θ, σ	2.38	3.05	1.00	0.08	1	0.0027	1
θ, σ_T	1.99	2.60	1.00	0.11	2	0.0029	2
θ_I, σ	1.96	2.57	1.00	0.12	3	0.0029	3
θ_T, σ	1.88	2.48	1.00	0.13	4	0.0030	4
θ, σ_I	1.72	2.21	1.01	0.14	5	0.0031	5
θ_T, σ_T	1.71	2.20	1.00	0.14	6	0.0031	6
θ_T, σ_I	1.27	1.63	1.01	0.21	7	0.0035	7
θ_I, σ_I	1.22	1.59	1.03	0.22	8	0.0036	8
θ_I, σ_T	1.02	1.34	1.02	0.27	9	0.0039	9
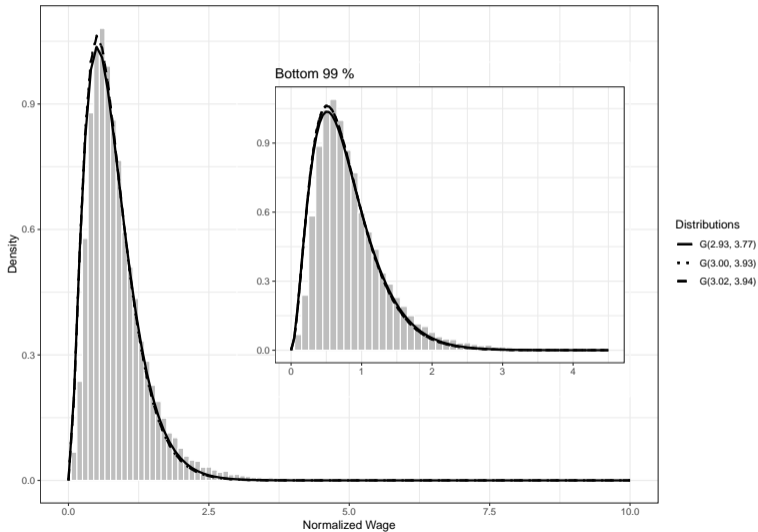
Summary

1 Wage growth differentials due to firms' turbulently equalizing abilities to pay

2 This adds a third component to the CPE theory of general wage inequalities

3 Simultaneous equalization and diffusion leads to stable cross-sectional distribution, good fit to US data

4 Simultaneous equalization and diffusion has economic interpretation and theoretical basis

Appendix Slides

Subsistence Wages and Cost of Re-Skilling (Smith and Marx)

"*A man educated at the expense of much labour and time to any of those employments which require extraordinary dexterity and skill, may be compared to one of those expensive machines. The work which he learns to perform, it must be expected, over and above the usual wages of common labour, will replace to him the whole expense of his education, with at least the ordinary profits of an equally valuable capital. [...] The difference between the wages of skilled labour and those of common labour is founded upon this principle.*" (Smith 1999 [1776], 145)

"*In order to modify the human organism, so that it may acquire skill and handiness in a given branch of industry, and become labour-power of a special kind, a special education or training is requisite, and this, on its part, costs an equivalent in commodities of a greater or less amount. This amount varies according to the more or less complicated character of the labour-power. The expenses of this education (excessively small in the case of ordinary labour-power), enter pro tanto into the total value spent in its production.*" (Marx 1993 [1867], 172)

"*Where all other circumstances are equal, wages are generally higher in new than in old trades. When a projector attempts to establish a new manufacture, he must at first entice his workmen from other employments by higher wages than they can either earn in their own trades, or than the nature of his work would otherwise require, and a considerable time must pass away before he can venture to reduce them to the common level.*" (Smith 1999 [1776], 163)

"This constant equalization of ever-renewed inequalities is accomplished more quickly, (1) the more mobile capital is, i.e. the more easily it can be transferred from one sphere and one place to others; (2) the more rapidly labour-power can be moved from one sphere to another and from one local point of production to another." (Marx, 1993a, pp. 297–298)

"This assumes competition among the workers, and an equalization that takes place by their constant migration between one sphere of production and another." (Marx, 1993a, p. 275)