# The Employability Theorem

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**Abstract**

In this document, the Employability Theorem is demonstrated from a set of fairly tautological axioms, which are presupposed in quantitative career choice and career development methods.

*Keywords:* Employability theorem; Career choice; Career development; Vocational choice; Occupational Information Network; O*NET.

## 1. Proof Plan

Time allocation by difficulty level:

$$\mathrm{ta}_q(\bar{l}) = \frac{\mathrm{ttc}(\bar{l})}{\int_0^1 \mathrm{ttc}(l)dl} \tag{1}$$

Employment by difficulty level:

$$w_q(\bar{l}) = w_q \times \mathrm{ta}_q(\bar{l}) \tag{2}$$

Employability per occupation:

$$\begin{aligned}
\tilde{w}_q^k = \tilde{w}_q(l_q^k) &= \int_0^1 T(l, l_q^k) w_q(l) dl && (3)\\
&= \int_0^1 [l_q^k \geq l] w_q \mathrm{ta}_q(l) dl && (4)\\
&= w_q \left( \int_0^{l_q^k} 1 \times \mathrm{ta}_q(l) dl + \int_{l_q^k}^1 0 \times \mathrm{ta}_q(l) dl \right) && (5)\\
&= w_q \int_0^{l_q^k} \mathrm{ta}_q(l) dl && (6)
\end{aligned}$$

And with $l_q^k = \tilde{Y}_q^k = \tilde{Y}(\boldsymbol{a_k}, \boldsymbol{a_q}) = Y(\boldsymbol{a_k}, \boldsymbol{a_q}) / Y(\boldsymbol{a_q}, \boldsymbol{a_q})$,

$$\tilde{w}_q^k = w_q \int_0^{\tilde{Y}_q^k} \mathrm{ta}_q(l) dl \tag{7}$$

Aggregate employability (entire economy):

$$\tilde{w}_k = \sum_{q=1}^{n} [\tilde{Y}_q^k \ddot{\tau}_q^k s_{kq}^\theta \geq 0.5] \tilde{w}_q^k \tag{8}$$

$$= \sum_{q=1}^{n} \left( [\tilde{Y}_q^k \ddot{\tau}_q^k s_{kq}^\theta \geq 0.5] \int_0^{\tilde{Y}_q^k} w_q \mathrm{ta}_q(l) dl \right), \tag{9}$$

$$\tilde{Y}_q^k = \tilde{Y}(\boldsymbol{a_k}, \boldsymbol{a_q}) = \frac{\prod_{i=1}^m \max(1 + a_i^k, 1 + a_i^q)^{\sigma_i^q}}{\prod_{i=1}^m (1 + a_i^q)^{\sigma_i^q}}, \tag{10}$$

$$\sigma_i^q = \frac{a_i^q}{\sum_{i=1}^m a_i^q} \tag{11}$$

P.S.: think of a notation for economic taxa / aggregation levels.
Aggregate employability (particular subset of the economy):

$$\tilde{w}_{?!}^k = \tilde{w}_k(?, !) = \sum_{q=1}^{n} [q \in ?!] [\tilde{Y}_q^k \ddot{\tau}_{kq}^\theta \geq 0.5] \tilde{w}_q^k \tag{12}$$

$$= \sum_{q=1}^{n} \left( [q \in ?!] [\tilde{Y}_q^k \ddot{\tau}_{kq}^\theta \geq 0.5] \int_0^{\tilde{Y}_q^k} w_q \mathrm{ta}_q(l) dl \right), \tag{13}$$

$$\tilde{Y}_q^k = \tilde{Y}(\boldsymbol{a_k}, \boldsymbol{a_q}) = \frac{\prod_{i=1}^m \max(1 + a_i^k, 1 + a_i^q)^{\sigma_i^q}}{\prod_{i=1}^m (1 + a_i^q)^{\sigma_i^q}}, \tag{14}$$

$$\sigma_i^q = \frac{a_i^q}{\sum_{i=1}^m a_i^q} \tag{15}$$

Notation for operation output (Ʊ is IPA's symbol for the "double-o" sound, e.g. as in the word "boot"):

$$Ʊ_q^k = \lfloor Y_q^k \rfloor \tag{16}$$

Aggregate occupational operation output:

$$Ʊ_q = \left\lfloor \sum_{k=1}^{n} [k \in \Lambda^{-1}(q)] ? \right\rfloor \tag{17}$$

Labor market taxa ($\Lambda$):

$$\Lambda_1^1 = \Lambda(1, 1) = \{1, \ldots, n\} \iff k, q \in \Lambda_1^1 \tag{18}$$

$$\Lambda = \{\Lambda_1^1, \ldots, \Lambda_n^{\bar{L}}\} \tag{19}$$

$$\Lambda^{-1}(k) = \Lambda_k^{\bar{L}} \tag{20}$$