Reading Dissatisfaction Well

Job Satisfaction, Vocational Exploration, and Growth

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Preliminary version; comments welcome. The code that reproduces all figures accompanies this document in the file material_suplementario_v2.zip. This is a translation of the Spanish original, *La insatisfacción bien leída: satisfacción laboral, exploración vocacional y crecimiento*; in case of discrepancy, the Spanish version prevails.

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Abstract

More satisfied workers are more productive, yet a country's satisfaction does not rise durably with its income. We propose a model that reconciles both facts. Following Spinoza's theory of the affects, job satisfaction adds to the taste for one's work two transitions, which accompany the growth of one's own power of acting and of income and fade with it, and a contentment that persists to the extent that one's ideas about oneself are adequate. Taste and mood speed up learning, so the satisfied worker's capacity advantage is mostly transitory, while the productivity advantage also keeps a permanent effort component. When learning is exhausted, dissatisfaction read with adequate ideas leads to exploration toward one's own nature; read with inadequate ideas, it leads to compensation through consumption, and debt can close the exit, especially near subsistence. In the aggregate, only the passive channel of satisfaction depends on the growth rate, and when creating new occupations becomes increasingly difficult, exploration raises the level of income but not its growth rate. In our numerical illustrations, improving the adequacy of ideas raises welfare under both criteria we analyze, and pays off more when done early; supporting transitions keeps the exit open, and limiting extraction reduces output losses. We propose a protocol to calibrate the model in organizations with validated instruments and personnel records.

Keywords: job satisfaction, affects, Spinoza, occupational choice, learning on the job, habits, variety-driven growth, Easterlin paradox.

JEL classification: J28, J24, D91, I31, O41.

1. Introduction

More satisfied workers produce more. In the laboratory, people induced to feel happier are about 12% more productive (Oswald, Proto and Sgroi, 2015). In a call centre, the mood produced by the weather visible from the workstation raises sales (Bellet, De Neve and Ward, 2024). In Finnish manufacturing plants, one standard deviation more of satisfaction, measured within each plant, is associated with 6.6% more value added per hour (Böckerman and Ilmakunnas, 2012).

At the aggregate level, the link becomes elusive. In the long run, a country's happiness does not rise when its income rises, although it rises in expansions and falls in contractions (Easterlin et al., 2010). Other studies find a positive relationship between income and satisfaction across countries and over time (Stevenson and Wolfers, 2008). In Colombia, the satisfaction of people aged 15 and over with their work or activity has stayed between 7.0 and 7.4 out of 10 between 2019 and 2025 (DANE, 2026).

How can satisfaction raise each person's productivity without growing with the economy? And why does dissatisfaction move some people to look for something better and leave others trapped? We argue that both questions have the same answer. Besides the taste for one's work, satisfaction has two parts: a transition, which accompanies the growth of one's own power of acting (and, through another channel, the growth of income) and fades when that growth stops, and a durable contentment, which persists to the extent that the person has adequate ideas about herself. The distinction comes from Spinoza's theory of the affects. When the transition fades, the dissatisfaction that appears, read with adequate ideas, pushes toward exploration in the direction of one's own nature; read with inadequate ideas, it pushes toward compensation through consumption and status, and compensation can close the exit.

The model has two levels. At the individual level, each person learns by doing up to a ceiling set by her initial conditions, with forgetting and with a plasticity that falls with age; her mood moves her effort; her beliefs mix her experience with the social valuation of each occupation, and changing costs her more near subsistence, with dependents and without liquidity. In the aggregate, those who saturate explore and create new occupations, which raise output through the gain from variety. The model yields four groups of results.

1. **The transition fades in any fixed occupation; contentment does not, entirely.** With adequate ideas, a contentment remains that grows with the power attained. Taste and mood speed up learning, so the satisfied worker's capacity advantage is mostly transitory, although the effort advantage persists; age reduces the value of changing through three separable channels.
2. **Dissatisfaction can trap.** Near subsistence it barely weighs in decisions, and whoever compensates for it with consumption, without rents or a support network, gets into debt until her exit is closed and is left exposed to extraction.
3. **In the aggregate, average satisfaction obeys an identity**: besides average taste, it has three terms, and only one depends on the growth rate. In the simulations, adequate ideas give direction to exploration: with them, exploring improves the match, leaves a durable

contentment and dissatisfaction predicts search; without them, the gain is mostly passive. If creating occupations becomes increasingly difficult, exploration raises the level of income and not its growth rate, although the theory does not say whether that is the case of a real economy.

4. **There is a hierarchy of policies.** In our simulations, raising χ improves welfare under the two criteria we use, and pays off more when done early; supporting transitions keeps the exit open, and limiting extraction reduces the output loss. Subsidizing exploration without raising χ improves welfare under the first criterion, but, if χ is low, under the second it gives a mostly passive gain, and a transitory one if creating occupations becomes increasingly difficult.

The paper makes five contributions.

- **Relative to models of motivated agents,** which are static, it adds dynamics: taste and mood speed up the accumulation of capacity.
- **Relative to models of occupational learning and of beliefs about oneself,** it adds affect as a signal for exploration and a belief that mixes experience with social valuation.
- **Relative to the literature on habits,** it applies habit to the capacity to act and adds a durable component that depends on the adequacy of ideas.
- **Relative to the debate on happiness and growth,** it offers three predictions that separate the mechanism from its rivals: the satisfaction hump after a change of tasks grows with the learning distance; within a country, the active facets follow the growth of capacities and not income; and satisfaction predicts search more strongly the more adequate one's ideas are.
- **For practice,** it associates each parameter with a validated instrument or a personnel record, so that the model can be calibrated in a specific organization (section 8.2 and appendix F).

Section 2 places the paper in the literature; section 3 presents the restrictions we take from Spinoza; section 4, the model; sections 5 to 7, the results and policy; section 8, the predictions and measurement; section 9, the limits; and section 10 concludes.

2. Literature and tension

Five literatures touch our question and none answers it. We organize them by the debate each one settles and by what it leaves open.

2.1 Motivation, meaning and incentives

Efficiency wage theory explains why a firm pays above the market when it cannot observe effort well (Shapiro and Stiglitz, 1984), and the theory of motivated agents shows that the taste for work can substitute for part of that incentive. When the organization's mission coincides with the worker's, the match saves on strong incentives (Besley and Ghatak, 2005); the motivated

worker exerts more effort and accepts a lower wage (Delfgaauw and Dur, 2007), and incentives can damage motivation (Bénabou and Tirole, 2003). The meaning of work affects satisfaction, productivity and labour supply (Cassar and Meier, 2018), and people accept lower wages for meaningful work (Hu and Hirsh, 2017), especially the best performers (Burbano, 2016). These models are static: taste raises today's effort, but not tomorrow's capacity.

2.2 Learning, occupational choice and beliefs about oneself

The quality of a match is discovered by working (Jovanovic, 1979), and choosing an occupation is a problem of experimentation (Miller, 1984). By working, people learn their comparative advantage, which explains why occupational change falls with age (Papageorgiou, 2014); human capital is largely task-specific, and people move toward occupations with similar requirements (Gathmann and Schönberg, 2010). Learning can itself be a source of motivation (Gibbs, 2021). When beliefs about oneself are biased, the choice of tasks is biased too: ego utility produces overconfidence even with Bayesian updating (Kőszegi, 2006), and an overconfident agent can move away from the correct belief as she learns (Heidhues, Kőszegi and Strack, 2018).

Searching while employed is a decision: search effort falls with the wage (Christensen et al., 2005), and in the data it is widespread, more intense on the lower rungs of the job ladder and, in a calibrated model, very elastic (Faberman, Mueller, Şahin and Topa, 2022). Changing jobs becomes less frequent with experience (Topel and Ward, 1992). Boredom signals when to switch from exploiting to exploring (Geana, Wilson, Daw and Cohen, 2016) and, at work, it is associated with turnover intention (Reijseger et al., 2013). Exploring does not always require leaving: people redesign their tasks from within (Wrzesniewski and Dutton, 2001; Tims, Bakker and Derks, 2012). In the economic models of this literature, affect is absent or constant: satisfaction does not work as a signal to search, and beliefs do not mix one's own experience with social valuation. The psychology of boredom does link affect with exploration, but without a model of the decision or of its aggregate effects.

2.3 Satisfaction, adaptation and habits

Since Freeman (1978), job satisfaction has been used as an economic variable. It predicts quits even controlling for wages and conditions (Clark, 2001; Clark, Georgellis and Sanfey, 1998), through a chain that runs from poor conditions to dissatisfaction, search and job change (Böckerman and Ilmakunnas, 2009); dissatisfied workers are very mobile (Akerlof, Rose and Yellen, 1988). But the effect is modest on average (Griffeth, Hom and Gaertner, 2000) and asymmetric: low satisfaction raises quits, and high satisfaction does not reduce them relative to intermediate levels (Green, 2010). The facet that weighs most changes with context: security and pay in the United Kingdom (Clark, 2001), the type of work in Denmark (Kristensen and Westergård-Nielsen, 2006). And if satisfaction is read as a preference for the current job over the alternatives, the residual of a satisfaction equation predicts quits better than its level (Lévy-Garboua, Montmarquette and Simonnet, 2007).

Satisfaction also adapts. Those who stay in the same job become less satisfied even if their wage rises (Grund and Sliwka, 2007); around a voluntary job change, satisfaction falls, jumps and falls again (Boswell, Boudreau and Tichy, 2005; Chadi and Hetschko, 2018); and adaptation is complete for some events and not for others (Clark, Diener, Georgellis and Lucas, 2008). In macroeconomics, consumption habits connect growth and saving (Carroll, Overland and Weil, 2000), and well-being responds more than twice as much to falls in growth as to equivalent rises (De Neve et al., 2018).

Decision utility and experienced utility are distinct (Kahneman, Wakker and Sarin, 1997): choice and predicted well-being usually coincide, but they diverge when purpose, control or status weigh in (Benjamin, Heffetz, Kimball and Rees-Jones, 2012). Making financial success a central aspiration is associated with lower well-being (Kasser and Ryan, 1993; Dittmar, Bond, Hurst and Kasser, 2014), and working conditions are a central part of compensation (Rosen, 1986; Maestas et al., 2023). This literature models adaptation to pay and consumption, not to the capacity to act; it does not connect it with exploration or with growth through the creation of occupations, and it does not explain why satisfaction predicts exit with such different strengths across studies.

2.4 Variety, capabilities and growth

Growth can come from the creation of variety and from the recombination of ideas. Weitzman (1998) argues that the limit lies in the capacity to process combinations, and Jones (2023) shows that combinatorial growth can deliver exponential growth. The complexity of a country's productive capabilities predicts its growth (Hidalgo and Hausmann, 2009). When creating becomes increasingly difficult, the long-run growth rate depends on population growth and not on policy (Jones, 1995); the accumulation of knowledge pushes toward specialization and teams (Jones, 2009); the decentralized economy usually underinvests in research (Jones and Williams, 2000), and people with balanced skills are more likely to become entrepreneurs (Lazear, 2005). An affective microfoundation of who explores, and why, is missing.

2.5 Spinoza and work

Lordon (2014) reads the employment relationship through Spinoza's anthropology of the affects. Recent philosophy debates whether Spinoza holds a dual theory of pleasure, with transitive and non-transitive joys (Smith, 2025). Neither work formalizes the dynamics of satisfaction or connects them with learning, occupational choice and growth.

2.6 The tension we resolve

The facts in the introduction have not been connected. Satisfaction raises each person's productivity, but a country's happiness does not rise with its income in the long run, although it moves with the cycle (Easterlin et al., 2010), and other studies find a positive relationship between income and satisfaction (Stevenson and Wolfers, 2008). A model in which satisfaction speeds

up learning, partly fades with it and guides exploration according to the adequacy of ideas reproduces both sets of facts, and says when dissatisfaction moves people and when it traps them.

3. Satisfaction as an affect

The literature usually treats job satisfaction as a function of levels: of the wage, of working conditions, of the fit between person and job. We start from Spinoza's theory of the affects, not to derive a functional form, which that theory does not determine, but to impose four qualitative restrictions. The concrete form, with logarithms and adapting habits, is our own choice, one shared by the habit-formation literature (Carroll, Overland and Weil, 2000).

3.1 Transition and contentment

Spinoza defines joy as the passage to a greater perfection, understood as power of self-affirmation. But he also describes blessedness, the highest happiness, as a form of joy and as perfection itself: if joy consists in the passage to a greater perfection, blessedness must consist in the mind being endowed with perfection itself (Ethics V, scholium to proposition 33). This tension has led many scholars to read in Spinoza a dual theory of pleasure, with transitive and non-transitive pleasures (Smith, 2025).

The first two restrictions follow.

1. **Satisfaction has a transition component** that responds to the change in the power of acting, measured against a reference that adapts. This component generates the hump of proposition 1 and the transition channels of proposition 6.
2. **It also has a durable component**, which exists only to the extent that ideas are adequate. When the mind regards itself and its power of acting, it feels joy (Ethics III, proposition 53), and from the third kind of knowledge arises the highest possible contentment (Ethics V, proposition 27). In the model, this component is $\mu\chi \ln(\mathcal{P}^{\text{ag}}/\bar{\mathcal{P}})$ (section 4.3).

Both restrictions have empirical correlates, besides the incomplete adaptation of section 2.3. The effect of a pay rise on satisfaction is anticipated and then partly fades (Diriwächter and Shvartsman, 2018), and flow theory describes the boredom that appears when skill exceeds challenge (Csikszentmihalyi, 1975; Engeser and Rheinberg, 2008).

3.2 Power is actual and has two faces

Spinoza's potentia is not a capacity waiting to be realized, but actual power (Viljanen, 2009), which rises or falls with the affects (section 3.1). That is why the ceiling κ is not a Spinozist notion: it is an Aristotelian tool that we keep to represent initial conditions.

The third restriction distinguishes two faces of power. Following Field (2020), we separate the power to produce effects from the power to act from one's own essence: in the model, the potentia operandi, what the person produces, and the potentia agendi, her capacity weighted by the alignment of the occupation with her nature. Thus, a person can gain satisfaction while losing productivity, if she moves to an occupation with more potentia agendi and less output (corollary 1), or produce a lot without joy.

3.3 The active and the passive

In Spinoza, an affect is active when it follows from adequate ideas, not because of its object. Passions are confused ideas, caused by external things, and they become actions when they are conceived adequately (Schmitter, 2021). Spinoza admits joys and desires that belong to us insofar as we act (Ethics III, propositions 58 and 59).

The fourth restriction is, therefore, that agency is not modelled as a free choice, but as the adequacy χ of the ideas the person has about herself. χ enters in three places: in beliefs, in the weight the decision gives to the active versus the passive life, and in durable contentment. We call the capacity channel active because its durable component exists only with adequate ideas; its transition, by contrast, is felt by anyone, like the income transition, which we call passive.

3.4 The conatus in the decision

Each thing, insofar as it is in itself, endeavours to persist in its own being (Ethics III, proposition 6). We read joy as the affective record that this endeavour is prospering; the reading is ours. In the decision, ψ measures how much affective life weighs against consumption, and χ decides which part of it weighs. Whoever pursues money or status as a purpose does not lack conatus: she directs it, with inadequate ideas, toward external causes.

3.5 What we do not take from Spinoza

Three elements of the model do not come from Spinoza: the ceiling κ, which is Aristotelian; the functional form (the logarithm, the habit and its speed), which comes from economics; and the use of the valuation of the agent guided by reason as a welfare criterion, a normative choice of ours, which is why we present it alongside experienced satisfaction.

Lordon (2014) offers a rival reading: what we call alignment could be desire aligned by the employer, that is, a passion. The model admits it as the case of low χ with a social valuation b_j shaped by the organization, and the difference from genuine alignment is observable: the contentment that comes from adequate ideas should persist after a change of employer toward an occupation with the same profile, and induced desire should fade with the employer who induced it. References to the Ethics follow Elwes's English translation (Spinoza, 1909); the paraphrases are ours.

4. Model

The model has six blocks. The first five describe a person: capacities and occupations; effort, learning and age; affect; beliefs and decision; and frictions to change. The last one, the creation of occupations and equilibrium, describes the economy. Time is continuous and we present the minimal version, with one occupation at a time; the vector version is in appendix C and the notation, in appendix E.

4.1 Capacities and occupations

A continuum of people i $\in [0, 1]$ has capacities in S dimensions. Each person has a vector of ceilings κ_i, which summarizes what her initial conditions allow her to come to do, and a vector of realized capacities k_i. Each occupation j requires a mix of capacities described by a profile a_j. The alignment between person and occupation and the taste for the occupation are:

$$\omega_{ij} = \frac{a_j \cdot \kappa_i}{\|a_j\| \, \|\kappa_i\|} \in (0, 1], \qquad \theta_{ij} = \gamma \, \omega_{ij} + \vartheta_{ij}$$

The idiosyncratic component ϑ_{ij} is not known in advance. In the minimal version, the person's state in an occupation is summarized by her capacity in efficiency units, h, with ceiling κ.

4.2 Effort, learning and age

The person receives a pay w per unit of output. The value of enjoying effort and its cost grow with the wage index Ω, because time becomes more valuable as the economy grows. If she chooses effort without looking at the future, she maximizes $w\,h\,e + \Omega(\theta e + \beta\lambda_A\,a\,e - e^2/2)$, and obtains:

$$e = \theta + \tilde{w}\, h + \beta\, \lambda_A\, a, \qquad \tilde{w} = w/\Omega$$

Here a is the active affect of section 4.3 and β measures how much mood moves effort. This specification makes growth leave effort unchanged, while consumption still enters the passive affect in absolute terms. Capacity grows with work, with a ceiling and with forgetting, at a pace that falls with age v:

$$\dot{h} = \pi(v)\, e \left(1 - \frac{h}{\kappa}\right) - \delta h, \qquad \pi(v) = \pi_0\, e^{-d_\pi (v - 20)}, \qquad T(v) = 65 - v$$

Plasticity π measures how much is learned per unit of effort, δ is the forgetting rate and T(v) is the remaining working horizon. Because time is limited, learning one occupation has the opportunity cost of not learning another.

4.3 Two powers and affect

The potentia operandi is what the person produces, $\mathcal{P}^{\text{op}} = \text{he}$. The potentia agendi is her capacity to act from her own nature, $\mathcal{P}^{\text{ag}} = \omega\text{h}$. Satisfaction has four components: taste, an active transition that responds to the growth of the potentia agendi, a durable contentment that grows with its logarithm and with the adequacy of ideas, and a passive transition that responds to consumption $\text{c} = \text{whe}$:

$$s = \theta + \lambda_A \Big[u_A + \mu\, \chi \ln \frac{\mathcal{P}^{ag}}{\bar{\mathcal{P}}} \Big] + \lambda_E\, u_E,$$

$$u_A = \ln \mathcal{P}^{ag} - H_A, \quad u_E = \ln c - H_E, \qquad \dot{H}_A = \rho_A (\ln \mathcal{P}^{ag} - H_A), \quad \dot{H}_E = \rho_E (\ln c - H_E)$$

Each transition compares the current level of its variable, $\mathcal{P}^{\text{ag}}$ or c, with a habit, H_A or H_E, which adapts at speed ρ_A or ρ_E: if the variable grows at a constant rate g, the transition converges to g/ρ_A or to g/ρ_E; if it stagnates, it converges to zero. This is the habit formation of section 2.3, applied also to the capacity to act. Durable contentment exists only if $\chi > 0$, and $\bar{\mathcal{P}}$ is a normalization. The active affect that enters effort is $\text{a} = \text{u}_\text{A} + \mu\chi \ln(\mathcal{P}^{\text{ag}}/\bar{\mathcal{P}}) + \nu\bar{\text{a}}$, where $\bar{\text{a}}$ is the team's average affect and $\nu < 1$ the intensity with which it is imitated.

4.4 Beliefs and decision

The person does not know her taste for an occupation until she practises it. Her belief $\hat{\theta}_\text{j}$ mixes the signal from her experience, $\tilde{\text{s}}_\text{j}$, with the social valuation of the occupation, b_j, which captures status and the expectations of her environment:

$$\dot{\hat{\theta}}_j = v_j \big[\chi\, \tilde{s}_j + (1-\chi)\, b_j - \hat{\theta}_j \big] \;\longrightarrow\; \tilde{\theta}_j = \chi\, \theta_j + (1-\chi)\, b_j$$

With $\chi = 1$ the person knows herself; with $\chi < 1$ she keeps a bias $(1-\chi)(\text{b}_\text{j} - \theta_\text{j})$ even as she accumulates experience, as in the misspecified self-models of section 2.2. The results use only two properties of this reduced form: the bias persists and points toward the social valuation. The bound in proposition 3 holds for any bias bounded by $(1-\chi)\Delta_\text{b}$, and the direction result of section 7.3 requires the bias to point toward b_j; if it were corrected with experience, both results would weaken. When choosing an occupation, the person values consumption above subsistence, the taste she anticipates and, with weight ψ, her affective life, of which χ decides which part she values:

$$W_j = \int_0^{T(v)} e^{-rt} \Big[\ln(c - \bar{c}_h) + \tilde{\theta}_j + \psi \Big(\chi\, \lambda_A \big(u_A + \mu\, \chi \ln \tfrac{\mathcal{P}^{ag}}{\bar{\mathcal{P}}} \big) + (1-\chi)\, \lambda_E\, u_E \Big) \Big] dt - F_j$$

With high χ, the weight ψ falls on growing and on the contentment of the power attained; with low χ, on the passive joy of income and status: this is the case of someone who has money as a purpose. That purpose is valued, and heterogeneously, has empirical support (sections 2.1

and 2.3). The direction and aggregate results use a low ψ (0.25) and a high one (3), and the age results use $\psi = 1$, with a variant with $\psi = 3$.

We use two welfare criteria in parallel, following the distinction between decision utility and experienced utility (Kahneman, Wakker and Sarin, 1997). The first is the valuation of the agent guided by reason, $W^*_j = W_j(\theta_j, 1)$. The second is experienced satisfaction s.

4.5 Frictions to change

Changing occupation costs $F_j = [F + F_\psi(v)] \cdot \mathbb{1}\{j \neq j_0\}$, where j_0 is the current occupation and $F_\psi(v) = F_0\, e^{d_F(v-20)}$ is a psychological cost that grows with age and that emotional support reduces. Section 6 adds the liquidity that the transition requires, a subsistence minimum $\bar{c}_h$ that grows with dependents, and the compensation of the lack of active joy with consumption. With these frictions, the cost of changing depends on each person's history and discomfort.

4.6 Creation of occupations and equilibrium

Over her life, each person learns, saturates and explores (section 7.1). Whoever explores creates new occupations at a rate that grows with the balance of her capacities, $\text{Bal}(k) = \min_d k^d \,/\, \max_d k^d$, because people with balanced skills are more likely to become entrepreneurs (Lazear, 2005). The number of occupations N grows with the mass of explorers:

$$\dot{N} = \eta\, N^{\varphi}\, P \int_0^1 \text{Bal}(k_i)\, \mathbb{1}_i^X\, di, \qquad \varphi < 1$$

The baseline case $\varphi < 1$ captures that creating becomes harder as more occupations exist; $\varphi = 1$ serves as a benchmark. Each occupation produces an intermediate good with the efficiency units it receives, I_j, and a final good combines them with elasticity of substitution $\sigma > 1$ (Dixit and Stiglitz, 1977):

$$Y = \Big(\sum_{j=1}^{N} I_j^{\frac{\sigma-1}{\sigma}} \Big)^{\frac{\sigma}{\sigma-1}}, \qquad w_j = \Big(\frac{Y}{I_j} \Big)^{1/\sigma}$$

In the symmetric case, $Y = N^{1/(\sigma-1)} L$, where L are the efficiency units, and the wage index grows as $N^{1/(\sigma-1)}$.

Equilibrium is defined over the distribution of people across their individual states, together with N (appendix A.11). Because preferences are compatible with balanced growth, decisions depend on the wage index only through relative pay, and the equilibrium is block-recursive: the individual distribution does not depend on N, and N depends on it only through the mass of explorers weighted by their balance. With $\varphi < 1$, the rate of creation of occupations converges to a unique stable value (appendix A.9), and the distribution of people converges to a unique stationary distribution (lemma 2, appendix A.11).

5. Individual results

This section establishes six results about a person who works in one occupation at a time. The proofs are in appendix A and the simulations in appendix B.

5.1 How far learning goes

With effort $e = \theta + \tilde{w}h$, where $\tilde{w}$ is pay relative to the wage index Ω, the learning equation has a single stable steady state:

$$\bar{h} = \frac{B_h + \sqrt{\Delta_h}}{2\pi\tilde{w}}, \qquad B_h = \pi\tilde{w}\kappa - \pi\theta - \delta\kappa, \qquad \Delta_h = B_h^2 + 4\pi^2\tilde{w}\theta\kappa$$

Lemma 1. The level $\bar{h}$ increases with taste θ, plasticity π and pay $\tilde{w}$, and decreases with forgetting δ. The first three derivatives vanish if and only if $\delta = 0$, in which case $\bar{h} = \kappa$. Taste and the ceiling are complements: $\partial^2\bar{h}/\partial\theta\partial\kappa = 2\delta\kappa\pi^2\theta/\Delta_h{}^{3/2} \geq 0$.

When affect enters effort (section 4), its transition part vanishes in the steady state and does not move $\bar{h}$. Durable contentment, by contrast, acts as an additional taste that grows with χ, but its effect is small: with $\beta = 0.2$ and $\mu = 0.5$, $\bar{h}$ goes from 8.922 with $\chi = 0$ to 8.975 with $\chi = 1$.

5.2 The transition fades; contentment remains

Proposition 1 (partial saturation). If the person starts below $\bar{h}$ and her reference is born at her initial level:

(a) her satisfaction converges to $\theta + \lambda_A\,\mu\,\chi\ln(\omega\bar{h}/\bar{\mathcal{P}})$;

(b) if mood does not enter effort ($\beta = 0$), the transition component u_A rises, reaches a single maximum and falls to zero;

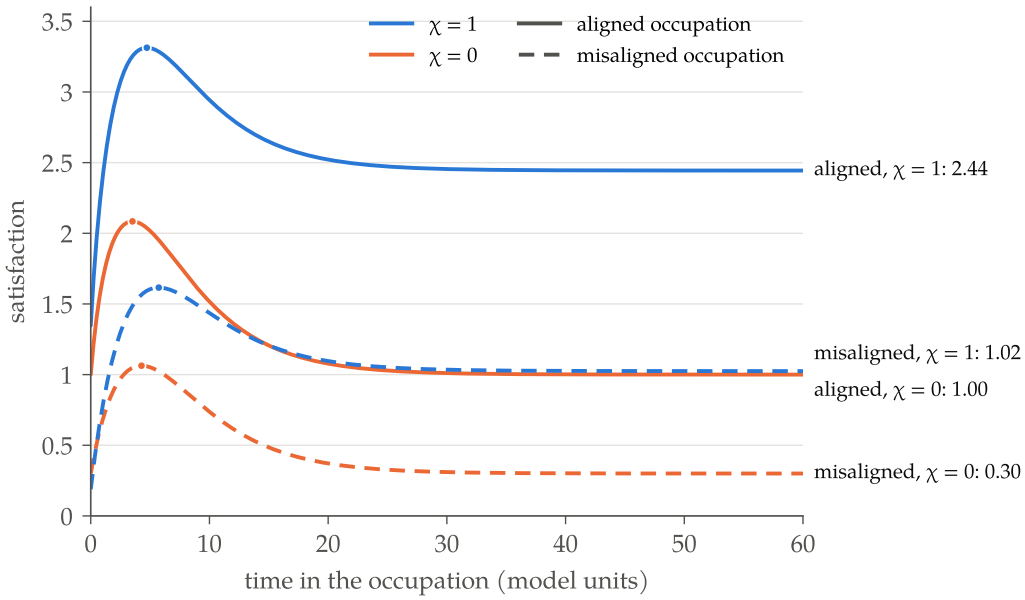
(c) the cumulative transition joy is exactly $\ln(\bar{h}/h_0)/\rho_A$;

(d) the final level increases with alignment and, if $\chi > 0$, with the ceiling. The cumulative transition joy increases with the ceiling for all $\delta \geq 0$, and with taste if and only if $\delta > 0$.

$$\int_0^\infty u_A\,dt = \frac{1}{\rho_A}\ln\frac{\bar{h}}{h_0}$$

With $\chi = 0$ saturation is complete, as in a theory of pure adaptation. With $\chi > 0$ it is partial: a contentment remains that grows with the logarithm of the power of acting attained. In an aligned occupation, satisfaction reaches a maximum of 2.08 and returns to 1.00 with $\chi = 0$. With $\chi = 1$, the maximum is 3.31 and it stabilizes at 2.44. In a misaligned occupation, the values are 1.06 and 0.30 with $\chi = 0$, and 1.62 and 1.02 with $\chi = 1$ (figure 1).

Figure 1. Satisfaction in a fixed occupation, with and without adequate ideas.



Note: model simulation. Aligned occupation: $\omega = 1$, $\kappa = 10$, $\theta = 1$; misaligned occupation: $\omega = 0.4$, $\kappa = 6$, $\theta = 0.3$; $\tilde{w} = 0.5$, $\pi = 0.8$, $\delta = 0.05$, $\rho_A = 0.2$, $\mu = 0.5$, $h_0 = 1$, $\lambda_E = 0$. The dot marks the maximum of each curve.

The hump matches the honeymoon-hangover evidence of section 2.3, and part (c) separates it from the novelty explanation. If the hump comes from learning, its area grows with $\ln(\bar{h}/h_0)$, and changes toward distant tasks should produce larger humps than changes between similar tasks; if it comes from novelty, its size should not depend on task distance.

Corollary 1 (joy from reallocation). When moving from occupation j to k, the transition component jumps by $\ln(\omega_k/\omega_j) + \ln(h_k/h_j)$ and then fades. Contentment changes durably by $\lambda_A\ \mu\ \chi\ [\ln(\omega_k\ \bar{h}_k) - \ln(\omega_j\ \bar{h}_j)]$. Only that long-run difference, weighted by χ, remains.

5.3 Taste and affect buy speed

Proposition 2 (dynamic complementarity between taste and learning). Let two people be identical except in taste, $\theta_H > \theta_L$, and start with the same capacity. Then:

(a) $h_H(t) > h_L(t)$ for all $t > 0$;

(b) the gap is born at zero, initially grows at rate $\pi(\theta_H - \theta_L)(1 - h_0/\kappa)$ and converges to $\bar{h}_H - \bar{h}_L$, which is positive if and only if $\delta > 0$;

(c) if the person with more taste starts with less capacity and $\delta > 0$, she overtakes the other permanently in finite time.

We use the term in a sense different from that of Cunha and Heckman (2007), where dynamic complementarity is between investments in skills at different stages.

The capacity advantage that taste gives is mostly transitory. In 293 of 295 random parameter combinations, the capacity gap is hump-shaped, and in 285 the maximum exceeds the final value by at least 1%. The hump is produced by the ceiling, which slows down earlier whoever learns faster: its size grows with closeness to the ceiling, and the two exceptions have a steady-state level very far from it (appendix B.2). In the baseline case, the gap reaches 1.73 and stabilizes at 0.15; with forward-looking effort, it reaches 0.52 and stabilizes at 0.12. The productivity gap adds to the capacity gap a static component, because more taste means more effort (appendix A.4): in the baseline case it rises to 16.2 and stabilizes at 7.6. That shape separates this mechanism from that of motivated agents (Delfgaauw and Dur, 2007), whose model is static: here, the productivity gap associated with taste should be largest at intermediate tenures and then fall toward its static component.

Affect adds a channel of its own. With $\beta = 0.2$, the time to reach 90% of $\bar{h}$ falls from 7.46 to 6.99 and the present value of output rises by 2.7%, without changing cumulative joy, which by proposition 1(c) does not depend on the path. The model thus reproduces the effect of mood on productivity documented in the introduction, by speeding up the ascent and not by changing the destination. If mood is imitated in the team with intensity $\nu < 1$, a common shock is amplified by $1/(1-\nu)$: a social multiplier in the sense of Glaeser, Sacerdote and Scheinkman (2003).

5.4 How much is lost outside the optimal vocation

The person starts from the occupation j_0 that her initial conditions gave her. She perceives her taste for each occupation as $\tilde{\theta}_j = \chi\theta_j + (1-\chi)b_j$ and chooses the one that maximizes $W_j(\tilde{\theta}_j, \chi)$, which already discounts the cost of changing F_j (section 4). Under the criterion of the agent guided by reason, $W^*_j = W_j(\theta_j, 1)$, the loss Γ is the difference between the value of the best occupation and that of the chosen one.

Proposition 3 (bounded vocational loss). If W_j is Lipschitz in taste with constant L_W, the loss satisfies:

$$\Gamma \le F + 2(1-\chi)\big(L_W\,\Delta_b + \psi\,M_J\big), \qquad M_J = \max_j \Big(\big|\lambda_A J^A_j - \lambda_E J^E_j\big| + 2\lambda_A\,\mu\,|L_j|\Big)$$

Here $\Delta_b = \max_j |b_j - \theta_j|$ is the largest social bias; $J^A{}_j$, $J^E{}_j$ and L_j are the active transition, the passive transition and the contentment that the person anticipates in occupation j, discounted at rate r (for example, $J^A{}_j = \int_0^{T(v)} e^{-rt} u_A\,dt$, and L_j with $\ln(\mathcal{P}^{ag}/\bar{\mathcal{P}})$ in place of u_A). The bound is written for $F_\psi(v) = 0$; with a psychological cost, it suffices to replace F with $F + F_\psi(v)$. In particular, $\Gamma = 0$ if $\chi = 1$ and $F = 0$. The bound has two sources, external obstacles (F) and the inadequacy of ideas $(1-\chi)$, and the second grows with ψ. The complementarity between the weight the person gives to growing and her self-knowledge is a property of the bound, not necessarily of the loss: in 2 of 150 simulated cases, the loss rises with χ over some range.

Plasticity erases the weight of history in productive value, but not in joy. Without the affective component, the difference in value between starting with capacity 0.5 and with capacity 5 goes from -22.3 to -0.28 when π goes from 0.2 to 25. Anticipated transition joy, by contrast, tends to $\ln(\kappa/h_0)/(r+\rho_A)$, so starting lower increases it (11.98 versus 2.77): whoever values growing has a reason to choose occupations in which she still has much to learn. Durable contentment depends only on the level reached, so with high plasticity it does not depend on the starting point either.

5.5 Trying and discarding

Proposition 3 assumes that beliefs have already converged. To study trial and error, we simulate a person who can try an occupation of uncertain taste, paying a switching cost and a learning cost that falls with plasticity. During the trial she receives noisy signals, and her belief mixes what she learns, with weight χ, with the social valuation, with weight $1-\chi$ (appendix B.4).

Table 1. Dynamic trial and error with high plasticity ($\pi = 2$): whether the person tries, where she ends up and how much she loses.

χ	No social bias: tries?	Ends in the right one	Mean loss	Social overvaluation: tries?	Ends in the right one	Mean loss
0 and 0.5	No	49%	4.83	Yes	51%	6.14
0.55	No	49%	4.83	Yes	100%	3.12
0.6	Yes	99%	2.72	Yes	100%	3.12
0.7	Yes	99%	2.67	Yes	100%	3.12
0.9	Yes	99%	2.63	Yes	99%	2.67
1	Yes	99%	2.62	Yes	99%	2.62

The effect of χ is a threshold effect. Without social bias, the person stops trying below a value between 0.55 and 0.6; above it, she tries and almost always gets it right. With social overvaluation and $\chi \leq 0.5$, she tries the occupation her environment values and half the time stays in it even if it turns out badly for her; with $\chi = 0.55$ she already gets it right, although the loss keeps falling until $\chi = 1$. With low plasticity ($\pi = 0.5$), even with $\chi = 1$ the person does not try and never learns whether the other occupation suited her (loss 2.54): this is the incomplete learning of an optimal experimenter (Rothschild, 1974). For policy, raising χ pays off mainly when it leads to crossing the threshold: going from 0 to 0.5 does not change the loss, and crossing it, between 0.5 and 0.6, almost halves it.

5.6 Age: three distinct reasons to stop changing

With age v, the working horizon $T(v) = 65 - v$ shortens, plasticity $\pi(v) = \pi_0\, e^{-d_\pi (v-20)}$ falls and the psychological cost of changing $F_\psi(v) = F_0\, e^{d_F (v-20)}$ rises. d_π and d_F are parameters to be estimated; in the illustration they equal 0.03 and 0.04.

Table 2. Value of the same change toward a better aligned occupation (ω from 0.55 to 0.85, ceiling from 8 to 10), with $\chi = 1$, $\psi = 1$ and $F_0 = 1$.

Active channels	Age at which it stops paying	Value at age 25	Value at age 45
Horizon only	58	11.35	6.80
Horizon and plasticity	46	10.32	0.25
All three channels	44	10.10	−1.47

Between ages 25 and 45, the horizon takes 4.55 off the value of the change, plasticity 5.52 and the psychological cost 1.50; with $\psi = 3$ and $F_0 = 3$, the threshold ages are 59, 49 and 45. Near retirement, the horizon produces a rational resignation, which is not a failure; in mid-life plasticity weighs more: a change worth 10.10 at age 25 stops paying before 45. The model thus generates the fall in occupational change with age, and its channels can be separated in the data: less plasticity shows up as slower learning after changing; more psychological cost, as fewer changes without slower learning; and the horizon, as the retirement age under the pension regime.

6. Frictions and traps

Section 5 treats the cost of changing, $F + F_\psi(v)$, as exogenous. Here it depends on each person's distance from subsistence, on her dependents, her liquidity and her support network, and it can grow with her own discomfort. The result is that dissatisfaction does not always move people: sometimes it traps them.

6.1 Near subsistence, satisfaction does not weigh in the decision

With a household minimum $\bar{c}_h = \bar{c}(1 + \kappa_d\, n_d)$, which grows with the number of dependents n_d, consumption enters the decision as $\ln(c - \bar{c}_h)$.

Proposition 4 (subsistence). The consumption value of one unit of affect is $\psi(c - \bar{c}_h)$, and it tends to zero as c approaches $\bar{c}_h$. Moreover, any change with a positive probability of taking consumption below $\bar{c}_h$ has a decision value of minus infinity.

Near the minimum, the person still feels her discomfort, but cannot act on it: the two welfare criteria diverge. This explains why people put up with mistreatment that they experience as such. Abusive supervision is associated with lower job and life satisfaction, and job mobility moderates part of its effects (Tepper, 2000). People with children are somewhat less willing to sacrifice pay for meaningful work (Hu and Hirsh, 2017).

6.2 Liquidity, dependents and support network

Changing requires paying F and going through a period D_{tr} with a reduced income φ_X y, where y is the person's income. With liquidity M, credit limit $\bar{D}$ and family support T_f, the change is feasible only if:

$$M + \bar{D} + T_f \;\geq\; F + D_{tr} \max\{0,\; \bar{c}_h - \varphi_X\, y\} + D_{tr}\, r_d \max\{0, -M\}$$

Emotional support enters elsewhere: it reduces the psychological cost of changing. Liquidity matters in job search: in Chetty (2008), 60% of the increase in unemployment duration caused by unemployment insurance is due to a liquidity effect.

6.3 The compensation trap

Whoever is saturated in an occupation that does not suit her feels an active joy below what she aspires to. Let ς denote that distance. She can compensate for it with passive joy: consumption and status. Powerlessness feeds the desire to acquire status products to compensate for it (Rucker and Galinsky, 2008). We assume that the person seeks a passive joy $\bar{u} = \varphi_c(1-\chi)\varsigma$, larger the less adequate her ideas. Because passive joy is a habit, sustaining $\bar{u}$ requires consumption to grow at rate $\rho_E\, \bar{u}$.

Proposition 5 (compensation trap). With constant income y, initial consumption $c_0 < y$ and $\bar{u} > 0$:

(a) consumption exceeds income at $t_0 = \ln(y/c_0)/(\rho_E\, \varphi_c\, (1-\chi)\, \varsigma)$;

(b) if the person is not a rentier, that is, if $\rho_E\, \bar{u} \geq r_s$ or $M_0 + y/r_s < c_0/(r_s - \rho_E\, \bar{u})$, where r_s is the return on saving, liquidity reaches the credit limit $-\bar{D}$ in finite time;

(c) if family support is smaller than the cost of changing evaluated at the limit, the exit closes in finite time and does not reopen while $\bar{u} > 0$. At the limit, consumption falls to $y - r_d\, \bar{D} < y$ and passive joy becomes negative while the habit adjusts. Reopening the exit would require saving, that is, consuming less than $y - r_d\, \bar{D}$, and that is precisely what compensation prevents.

The trap does not require preferences for money. It suffices that active joy is missing, that ideas are not very adequate and that passive joy adapts.

Table 3. Years until the exit closes. Income of 1 per year, $c_0 = 0.95$, $\rho_E = 0.6$, $\varphi_c = 0.5$, $\varsigma = 0.3$; minimum of 0.5 per adult and 0.15 per dependent; one-year transition with 30% of income; monetary cost of changing of 0.2; debt at 20% per year.

Initial situation	$\chi = 0.2$	$\chi = 0.8$	$\chi = 1$
Liquidity of 0.25 years of income and credit of 1 year, no support	5.0	11.9	Does not close
Same, with 2 dependents	4.3	10.9	Does not close

Initial situation	$\chi = 0.2$	$\chi = 0.8$	$\chi = 1$
Same, with family support of 1 year of income	Does not close	Does not close	Does not close
No liquidity or credit, with 2 dependents	Closed from the start	Closed from the start	Closed at the start; opens after 11.7 years

With $\chi = 0.2$, compensation closes the exit more than twice as fast as with $\chi = 0.8$; with $\chi = 1$ it does not close it. The support network is the only instrument in this calibration that keeps it open for any χ. Without liquidity, without credit and with dependents, the exit is closed at the start for any χ, and only with $\chi = 1$ does it open, after almost 12 years of saving: improving ideas is not enough without support for the transition.

6.4 Entrapment and extraction

Entrapment has an effect that goes beyond whoever suffers it: whoever cannot leave has a worse outside option, and what a boss can extract from her increases. We call potestas that power of command over others, to distinguish it from the potentia of section 3.2. In a reduced version of the model of the companion paper (Villalba Arango, in preparation; appendix B.7), when entrapment goes from 0 to 0.6, extraction rises from 0.13 to 0.53 and output falls from 0.88 to 0.43; each unit extracted costs between 1.3 and 2.6 units of output. The loop domination → powerlessness → compensation → debt → entrapment → more extraction is developed in that paper. The link has precedents: in a static model, better outside options reduce coercion (Acemoglu and Wolitzky, 2011), and in couples the abuser sabotages the victim's outside option to prevent her exit (Adams, Huttunen, Nix and Zhang, 2024).

7. Aggregate results and policy

This section takes the results to the aggregate and derives from them a hierarchy of policies.

7.1 Phases of working life

Each person learns (phase A), is saturated (Z) or explores (X). She moves from A to Z at rate α, from Z to X at rate ε, from X to A at rate q when she finds an occupation, and dies at rate m. In the steady state, the fractions are:

$$f_A = \frac{(\varepsilon + m)(q + m)}{\mathcal{D}}, \qquad f_Z = \frac{\alpha(q + m)}{\mathcal{D}}, \qquad f_X = \frac{\varepsilon\alpha}{\mathcal{D}},$$
$$\mathcal{D} = \varepsilon(\alpha + q + m) + (\alpha + m)(q + m)$$

The fraction that explores grows with ε and with α: whoever learns fast saturates earlier and explores more over her life. Both rates come from the individual block. α is the inverse of the

time to saturation. For ε, upon saturating, each person estimates with her decision value the gain from one round of search, $\Delta_{p,i} = \mathbb{E}[\max(\tilde{W}_k - \tilde{W}_j, 0)]$, over the offers k she could find; with a quadratic search cost, the optimal intensity is proportional to that gain, $\varepsilon_i = \bar{\varepsilon}\ \Delta_{p,i}/\bar{\Delta}_p$, where $\bar{\varepsilon}$ and $\bar{\Delta}_p$ are the mean intensity and the mean gain at saturation in a reference population, and their ratio is calibrated once: in an organization, $\bar{\varepsilon}$ comes from the duration model of appendix F and the perceived gain only ranks people; in our simulations, the scale is set with a run with $\chi = 0.5$ (appendix B.11). The rule is convex: search shoots up when the current occupation is bad and flattens when it is good, as in the asymmetry found by Green (2010). The fractions hold with ε equal to the mean intensity of those who are saturated.

7.2 The identity of average satisfaction

With death at a constant rate and references born at each person's own level, average satisfaction satisfies in the steady state:

$$\bar{S} = \mathbb{E}[\theta] + \lambda_A \mu\, \mathbb{E}\left[\chi \ln \frac{\mathcal{P}^{ag}}{\bar{\mathcal{P}}}\right] + \frac{\lambda_A m}{\rho_A}\, \mathbb{E}\left[\Delta_{\text{life}} \ln \mathcal{P}^{ag} - u_A^{\text{death}}\right] + \frac{\lambda_E}{\rho_E}\left(g_Y + m\, \mathbb{E}\left[\Delta_{\text{life}} \ln(c/\Omega) - u_E^{\text{death}}\right]\right)$$

Proposition 6 (aggregate identity).

(a) The passive channel adds $\lambda_E\ g_Y/\rho_E$. In this channel, the arrow runs from growth to satisfaction: an increase in the level of income gives a transitory joy, and only sustained growth maintains the term.

(b) The active transition channel depends on how much the potentia agendi grows over a lifetime, not on how many times one changes occupation.

(c) The level term depends on the power attained, weighted by χ. Directed exploration raises it permanently. Undirected turnover lowers it, because each change reduces accumulated capacity.

Besides average taste, the identity has three terms, and only the passive one is tied to the growth rate: an increase in the level of income gives each person a transitory joy, and only sustained growth maintains $\lambda_E\ g_Y/\rho_E$. That is why the model is consistent with the absence of a long-run relationship between income and happiness and with their short-run co-movement (Easterlin et al., 2010). Among economies growing at the same rate, permanent differences in satisfaction come from average taste, from the level term and from the active transition; the passive one separates them only if they grow at persistently different rates. In the agent simulation, the identity reproduces average satisfaction with errors below 0.004 (appendix B).

7.3 Adequate ideas give direction

Whoever explores chooses among new occupations according to her decision value. With low χ, her belief follows the social valuation, which in the simulation goes along with pay and status; with high χ, it follows her true taste and the person values growing. Table 4 shows what a saturated person chooses when facing 4,000 offers, with a low and a high weight on affective life.

Table 4. Direction of exploration by χ and ψ.

ψ	χ	Changes that raise long-run power	Mean Δ ln $\mathcal{P}^{ag}$	Wage premium of the chosen option	Perceived value of searching
0.25	0	74.1%	+0.26	+0.21	5.41
0.25	0.5	80.2%	+0.32	+0.19	4.94
0.25	1	86.0%	+0.38	+0.17	4.96
3	0	70.6%	+0.22	+0.21	6.88
3	0.5	86.2%	+0.38	+0.18	6.79
3	1	96.2%	+0.44	+0.14	10.48

χ gives direction for any ψ: even with low ψ, the share of changes that increase power rises from 74% to 86%. ψ amplifies in both directions: with adequate ideas, more weight on affective life improves direction (from 86% to 96%); with inadequate ideas it worsens it (from 74% to 71%), because the passive joy of pay is sought: money as a purpose. When affective life weighs, whoever has adequate ideas does not explore less: with high ψ, she values searching 1.5 times more than whoever has inadequate ideas (10.48 versus 6.88), and the latter overestimates what she will gain (her true gain is 5.91). With low ψ, by contrast, she values it somewhat less (4.96 versus 5.41).

In the agent simulation (5,000 people, 3 seeds per case, taste consistent with alignment), raising ε from 0.02 to 0.5 raises the benchmark growth rate (with $\varphi = 1$) from 0.6% to 3.1% for any χ. With $\psi = 3$, average satisfaction rises by 0.061 with $\chi = 0.2$ and by 0.140 with $\chi = 0.9$ (0.057 and 0.117 with $\psi = 0.25$). The difference comes from direction: average taste rises by 0.008 versus 0.044 and the level term by 0.004 versus 0.047, while the passive gain is almost the same (0.044 versus 0.041). Without adequate ideas, exploring more raises satisfaction almost only through the passive channel; with them, it also improves matching and leaves a durable contentment.

The endogenous intensity of section 7.1, with the scale calibrated with $\chi = 0.5$ and fixed for the rest (appendix B.11), adds three results. First, χ changes who explores more than how much: the fraction that explores stays between 5.4% and 5.9% for any χ and ψ. Second, satisfaction predicts search only with adequate ideas: with $\psi = 3$, its correlation with search intensity at saturation is -0.05 with $\chi = 0.2$ and -0.53 with $\chi = 0.9$; with inadequate ideas, people search according to the social valuation, not according to their discomfort. If χ varies across people, the average gradient mixes strong and almost null gradients, which is consistent with the modest average effect of section 2.3. Third, having those who gain most explore pays off more than a

common rate: with $\chi = 0.9$ and $\psi = 3$, average satisfaction reaches 2.35 with 5.9% exploring, versus 2.19 with a common rate and 5% exploring.

7.4 Levels, not rates

Proposition 7 (levels, not rates). If creating occupations becomes harder as more exist ($\varphi < 1$) and population grows at rate n, on the balanced growth path:

(a) the number of occupations grows at $n/(1-\varphi)$ and output per person at $n/((1-\varphi)(\sigma-1))$, regardless of how much people explore or how adequate their ideas are;

(b) exploration raises the level of output per person with elasticity $1/((1-\varphi)(\sigma-1))$;

(c) a permanent increase in exploration produces a finite additional passive joy, equal to $\Delta \ln Y_\infty/\rho_E$;

(d) the active terms do not change with φ, because they depend on the direction of careers.

Parts (a) and (b) are the semi-endogenous result of Jones (1995) applied to this economy, and (c) is the aggregate version of proposition 1; appendix B.10 illustrates them numerically. The conclusion depends on assuming $\varphi < 1$: with $\varphi = 1$, exploration moves the rate, and the theory does not say which of the two cases describes a real economy. Appendix D shows that an expanding capacity frontier raises the long-run rate, but does not give χ effects on it back, except in a limiting case.

7.5 Efficiency and policy

Each saturated person chooses her search intensity with a convex cost $C_s(\varepsilon)$, equating the marginal cost to her private gain Δ_p, as in section 7.1. A planner adds the effect that this search has on others, E_x.

Proposition 8 (efficiency).

(a) Under the criterion of the agent guided by reason, $E_x > 0$, so there is too little search. Each new occupation raises everyone's wage through the gain from variety, and each person ignores it; moreover, creating an occupation gives no rent to its creator. To this externality is added an internality: with $\chi < 1$, changes toward one's own nature are undervalued.

(b) Under the criterion of experienced satisfaction, the benefit of searching more through the passive channel is finite and transitory (proposition 7).

(c) In the simulations, raising χ improves welfare under both criteria.

Part (a) is a theorem, consistent with Jones and Williams (2000): the decentralized economy typically underinvests in R&D, except with very strong congestion and very high interest rates. Part (b) follows from proposition 7(c); (c) is a simulation result (sections 5.5 and 7.3). Table 5 summarizes each instrument under the two criteria.

Table 5. Policy instruments by welfare criterion.

Instrument	Criterion of the agent guided by reason	Criterion of experienced satisfaction
Subsidizing exploration without raising χ	Improves: corrects the variety externality	With low χ, mostly passive and transitory gain; with high χ, it also improves matching
Raising χ early (guidance, task trials)	Improves: direction and internality	Improves: average taste and durable contentment
Support for transitions (liquidity, insurance)	Improves: opens the exit (proposition 5)	Improves: avoids the compensation trap
Rules that limit extraction	Improves: less output loss (section 6.4)	Improves: less alienation, in the companion model (appendix B.7)

Three complementarities order policy. Raising χ pays off more when done early, because the changes toward one's own nature that it enables are worth more when more working life and more plasticity remain: with $\chi = 1$, the same change is worth 10.10 at age 25 and stops paying before 45 (table 2). It pays off more when it leads to crossing the threshold of table 1. And it is not enough without liquidity: with dependents and without credit, the exit is closed at the start for any χ (table 3). The magnitudes are not calibrated, and the cost of each instrument is not evaluated here.

8. Testable implications and measurement

A theory is worth what it allows one to refute. This section gathers eight predictions (table 6), each with its strongest rival explanation and the way to tell them apart. It then shows how to measure each parameter and calibrate the model in a specific organization (section 8.2 and appendix F). Almost all tests require following the same people over time.

8.1 Predictions

Table 6. Predictions, rival explanations and tests.

Prediction	Rival explanation	How to tell them apart
1. After a change of tasks, satisfaction rises and then falls, and the area of the transition, net of the contentment that accumulates, grows with the learning distance (P1c)	Novelty: the honeymoon appears with any change (Chadi and Hetschko, 2018)	Interact the size of the hump with the task distance between the previous and the new occupation (Gathmann and Schönberg, 2010)
2. After saturation, satisfaction with the work itself stays higher among those with high χ (P1a)	Selection: those with high χ are already in better matches	Measure χ before assignment and compare people in the same occupation

Prediction	Rival explanation	How to tell them apart
3. The productivity gap associated with initial taste is largest at intermediate tenures and then falls toward a static effort component; the capacity gap persists only if skills depreciate (P2)	Those with more taste concentrate in better firms	Firm fixed effects and variation in depreciation across occupations
4. A mood shock speeds up learning more at the start of a job than at saturation, because the effect of effort on learning, $\pi(1 - h/\kappa)$, falls as the ceiling approaches (section 4.2)	Mood moves effort without affecting learning	Mood shocks such as the weather (Bellet et al., 2024), interacted with tenure in the task
5. Among the saturated with low χ, consumer debt grows and the probability of changing falls with it (P5)	Exogenous liquidity constraints or impatience	Consumption of status goods after falls in satisfaction; liquidity shocks that reopen the exit
6. Changing falls with age through three separable channels (section 5.6)	Horizon only: rational resignation	Speed of learning after changing and variation in the retirement age
7. Within a country, the active facets of satisfaction follow the growth of capacities and χ, not the level of income (P6)	Working conditions as a normal good, or relative income	Cohort panels; with normal amenities, the active facets would follow the level of income
8. Among the saturated, satisfaction predicts search and exit more strongly the higher χ is (section 7.3)	Measurement error: in some people satisfaction is noisier and its gradient is attenuated	Measure χ beforehand and interact it with satisfaction in a duration model from saturation; control for the test-retest reliability of each person's satisfaction

Predictions 1, 7 and 8 are those that best separate the mechanism from its rivals. The first uses the identity of proposition 1(c), which pure novelty does not imply. The seventh avoids a cross-country comparison, which would not discriminate: if working conditions are normal goods, rich countries would have more satisfaction with the work itself without any affect, and a theory of relative income predicts a flat gradient in pay satisfaction; within a country and by cohort, by contrast, the active facets should follow the growth of capacity, and amenities, income. The eighth explains why satisfaction predicts exit with such different strengths across studies: the gradient depends on the adequacy of the ideas of those who make up the sample.

8.2 Measurement and calibration in an organization

The model is designed to be applied in organizations: each parameter is associated with a short, validated instrument or with records that organizations already have, and appendix F provides the full correspondence (table 7), the data available in Colombia and a step-by-step protocol. Three measurements require more care. The facets of satisfaction approximate the channels: the work itself and initiative, the active one; pay and security, the passive one (Clark, 2001). χ is measured by comparing the satisfaction a person predicts at the end of a short trial of a task with the one she feels after saturating in it, net of contentment, with randomly assigned tasks and controls for projection bias (Loewenstein, O'Donoghue and Rabin, 2003). And search, outside or inside the organization, is measured from the date of saturation: in the simulations, the mean intensity of those already saturated is between 5 and 7 times lower, because those who gain most from searching leave first (appendix B.11).

9. Limits

The results rest on three central assumptions, and four others bound the aggregate analysis; the normative choice of the welfare criterion is discussed in section 3.5. No magnitude is calibrated: the numbers in the text illustrate mechanisms; they do not estimate effects.

Central assumptions.

1. **Capacities depreciate.** Without forgetting, taste changes only the speed of learning and not its final level, and proposition 2 loses its parts about levels.
2. **The functional form of affect.** The transition is a logarithmic gap with an adapting habit, and contentment is proportional to χ and to the logarithm of power. Spinoza motivates the two components, not their form; with another form, the magnitudes and the terms of the aggregate identity would change. For example, the evidence does not support the symmetry of the passive channel (section 2.3): with loss aversion in u_E, contractions would weigh more than expansions, an asymmetry that would serve to test the channel.
3. **The weight ψ of affective life in the decision.** The direction that χ gives to exploration exists for any ψ, but its magnitude depends on it (table 4). That is why we show a low and a high regime, and do not calibrate ψ.

Limits of the aggregate analysis.

1. **Exploration intensity comes from a simple rule.** It is proportional to the perceived gain from searching, with a scale calibrated with data instead of being derived from a full dynamic problem. The stationary distribution exists and is unique (lemma 2), but the lemma assumes that the team's mood does not move effort.
2. **Creation proportional to the balance of capacities is an assumption** with indirect empirical support (Lazear, 2005). Creators are individual generalists, although the accumulation of knowledge pushes toward teams of specialists (Jones, 2009).

3. **The variety aggregator without congestion determines the sign of the externality.** With strong duplication or congestion, it can shrink or reverse.
4. **That exploration moves levels and not rates comes from assuming $\varphi < 1$.** The theory does not discipline that parameter.

What is left out. The model omits unemployment and informality, central features of labour markets such as Colombia's; the frictions block captures part of their effects, through subsistence and liquidity, but not their own dynamics. Potestas appears only as a source of entrapment; the choice between producing and extracting, and the institutions that regulate it, are the subject of a companion paper (Villalba Arango, in preparation).

10. Conclusion

We started from a tension: satisfaction raises each person's productivity, but it does not grow durably with a country's income. The tension disappears when satisfaction is understood as the taste for one's work plus a transition, which accompanies the growth of one's own power of acting and of income and fades with it, and a contentment that persists to the extent that one's ideas about oneself are adequate.

In the individual, the transition fades in any fixed occupation. Taste and mood speed up learning, but the satisfied worker's capacity advantage is mostly transitory, and trying other occupations profitably requires a threshold of adequacy of ideas. Dissatisfaction does not always move people: near subsistence it does not weigh in decisions, and whoever compensates for it with consumption, without rents or a support network, gets into debt until her exit is closed and is left exposed to extraction. In the aggregate, only the passive channel depends on the growth rate; in the simulations, adequate ideas turn exploration into better matching and durable contentment, and if creating becomes increasingly difficult, exploration raises the level of income and not its rate, a conclusion that depends on a parameter the theory does not determine.

The policy implication is concrete: subsidizing exploration is not enough. Adequacy of ideas must be improved early, with guidance and task trials, when changing is cheap; the transitions of those without liquidity or a network must be supported, without which adequate ideas take years to open the exit, if they open it at all; and extraction must be limited with rules that do not depend on the virtue of whoever is in command. The cost of these instruments is not evaluated here.

Three tasks remain: testing the predictions of section 8, starting with the one that relates the size of the hump to task distance; applying the protocol of appendix F in organizations, starting with the measurement of χ; and deriving exploration intensity from a full dynamic problem. The choice between producing and extracting is developed in a companion paper.

The title summarizes the argument. Income, its level in the baseline case, does not rise because of high satisfaction, but because of the dissatisfaction that appears when learning is exhausted, provided that whoever experiences it reads it with adequate ideas about her own nature and has the means to act accordingly.

Statements

Use of artificial intelligence. In preparing this manuscript, Claude (Anthropic), a language model, was used as an assistant to search for and verify literature, formalize the model, write and debug the simulation code, draft and edit text and simulate a peer review. The model starts from a proposal by the author, who reviewed the proofs, the figures and the text and is responsible for all content. Each reference was checked against its source. This English version is a translation of the Spanish original prepared with the same assistant; in case of discrepancy, the Spanish version prevails.

Code and data availability. The code that reproduces all figures accompanies the manuscript as supplementary material, with an instruction file, the requirements and the reference outputs. It is distributed together with this working paper, on the author's website, as material_suplementario_v2.zip, and it will be deposited in a public repository with a persistent identifier. The code comments and instruction file are in Spanish. The paper uses no microdata; the DANE figures cited are public.

Conflicts of interest. The author is the founder of VIP Protocol (Verified Impact Protocol), a consulting firm that could offer services based on the measurement protocol of appendix F. The author is also affiliated with En Red Dados, an organization that offers training and measurement services in organizations that could use that protocol. There are no other interests to declare.

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Appendix A. Proofs

Unless otherwise stated, $f(h) = \pi(\theta + \tilde{w}h)(1 - h/\kappa) - \delta h$, with $\theta > 0$, $\tilde{w} > 0$, $\pi > 0$, $\kappa > 0$, $\delta \geq 0$ and $0 < h_0 < \bar{h}$. Mood does not enter effort ($\beta = 0$) unless stated otherwise.

A.1 Lemma 1

f is a second-degree polynomial with leading coefficient $-\pi\tilde{w}/\kappa < 0$, so it is strictly concave. Moreover $f(0) = \pi\theta > 0$ and $f(\kappa) = -\delta\kappa \leq 0$. If $\delta > 0$ there is a unique root in $(0, \kappa)$; if $\delta = 0$, the root is κ. At the root $f'(\bar{h}) < 0$, so it is stable, and for $h_0 < \bar{h}$ the solution grows monotonically toward $\bar{h}$. The equation $f(h) = 0$ is equivalent to $\pi\tilde{w}h^2 - B_h\, h - \pi\theta\kappa = 0$, whose positive root is the one in the text. By the implicit function theorem, $\partial\bar{h}/\partial x = -f_x/f_h$ with $f_h(\bar{h}) < 0$, and:

$$f_\theta = \pi\Big(1 - \frac{\bar{h}}{\kappa}\Big), \quad f_\pi = (\theta + \tilde{w}\bar{h})\Big(1 - \frac{\bar{h}}{\kappa}\Big), \quad f_{\tilde{w}} = \pi\bar{h}\Big(1 - \frac{\bar{h}}{\kappa}\Big), \quad f_\delta = -\bar{h}, \quad f_\kappa = \frac{\pi(\theta + \tilde{w}\bar{h})\bar{h}}{\kappa^2}$$

The first three are non-negative and vanish if and only if $\bar{h} = \kappa$, that is, if and only if $\delta = 0$. The cross derivative, $2\delta\kappa\pi^2\theta/{\Delta_h}^{3/2}$, is obtained by differentiating the closed form and was verified symbolically with sympy (supplementary material). ■

A.2 Proposition 1

Let $x = \ln\omega + \ln h$, so that $\dot{x} = f(h)/h$. Since f is concave with $f(0) > 0$, $f'(h)h - f(h) \leq -f(0) < 0$ holds, and $f(h)/h$ is strictly decreasing. Since h grows toward $\bar{h}$, $\dot{x}$ is positive, strictly decreasing and tends to zero.

(a) The transition satisfies $\dot{u}_A = \dot{x} - \rho_A\, u_A$ with $u_A(0) = 0$, so $u_A(t) = \int_0^t e^{-\rho_A(t-t')}\, \dot{x}(t')\, dt' \geq 0$ and tends to zero. Consumption converges, so u_E also tends to zero. Contentment $\lambda_A\, \mu\, \chi\, \ln(\omega h/\bar{\mathcal{P}})$ converges to $\lambda_A\, \mu\, \chi\, \ln(\omega\bar{h}/\bar{\mathcal{P}})$, which gives the limit in the text.

(b) Since $u_A(0) = 0$ and $\dot{u}_A(0) = \dot{x}(0) > 0$, u_A is positive at the start. At any critical point, $\ddot{u}_A = \ddot{x} < 0$, so every critical point is a strict local maximum. A continuously differentiable function cannot have two strict maxima without a minimum between them, so the maximum is unique.

(c) Integrating $\dot{u}_A = \dot{x} - \rho_A\, u_A$ between 0 and T: $u_A(T) = x(T) - x(0) - \rho_A \int_0^T u_A\, dt$. Letting $T \to \infty$, $u_A(T) \to 0$ and $x(T) - x(0) \to \ln(\bar{h}/h_0)$. This step only uses that h converges to $\bar{h}$, so (c) also holds with $\beta > 0$.

(d) The final level is $\theta + \lambda_A\, \mu\, \chi\, \ln(\omega\bar{h}/\bar{\mathcal{P}})$. It increases with ω because $\theta = \gamma\omega + \vartheta$, because ω enters the logarithm and because $\bar{h}$ increases with θ. It increases with κ if $\chi > 0$, because $f_\kappa > 0$ for all $\delta \geq 0$. Cumulative joy $\ln(\bar{h}/h_0)/\rho_A$ increases with κ for all $\delta \geq 0$ and with θ if and only if $\delta > 0$, by lemma 1. ■

A.3 Corollary 1

At the instant of the change, x jumps from $\ln(\omega_j\, h_j)$ to $\ln(\omega_k\, h_k)$. The habit H_A is continuous because its derivative is bounded, so u_A jumps by the same amount and then fades. Contentment depends on the level of x, so its long-run change is $\lambda_A\, \mu\, \chi\, [\ln(\omega_k\, \bar{h}_k) - \ln(\omega_j\, \bar{h}_j)]$. ■

A.4 Proposition 2

Let $\Delta = h_H - h_L$, with $\Delta(0) = 0$. For $h < \kappa$, $f_H(h) - f_L(h) = \pi(\theta_H - \theta_L)(1 - h/\kappa) > 0$, so Δ is positive on an interval $(0, \bar{t})$. If there were a first $t_1 > 0$ with $\Delta(t_1) = 0$, at that point, with $h^* = h_H(t_1) = h_L(t_1)$, $\dot{\Delta}(t_1) = \pi(\theta_H - \theta_L)(1 - h^*/\kappa) > 0$, which contradicts Δ reaching zero from positive values. The limits follow from lemma 1. For (c), if $\delta > 0$ then $\bar{h}_H > \bar{h}_L$, and there exists T such that $h_H(t) > h_L(t)$ for $t > T$. The output gap decomposes as:

$$h_H(\theta_H + \tilde{w}h_H) - h_L(\theta_L + \tilde{w}h_L) = (\theta_H - \theta_L)\, h_L + \Delta\, \big[\theta_H + \tilde{w}(h_H + h_L)\big]$$

The first term is the static effect of effort and the second, proportional to Δ, the dynamic one. The hump shape of Δ is a numerical result, not a theorem. ■

A.5 Proposition 3

Let $\tilde{W}_j = W_j(\tilde{\theta}_j, \chi)$ and $W^*_j = W_j(\theta_j, 1)$, with F_j as in section 4.5, and let $j^* = \operatorname{argmax}_j W^*_j$ be the best occupation under the rational criterion. We assume $W_j(\cdot, \chi)$ is Lipschitz in taste with constant L_W, uniform in χ.

First step. From the definition of W_j:

$$W_j(\theta, \chi) - W_j(\theta, 1) = \psi(1 - \chi)\big[\lambda_E J_j^E - \lambda_A J_j^A - \lambda_A \mu(1 + \chi) L_j\big]$$

With $|\tilde{\theta}_j - \theta_j| = (1 - \chi)|b_j - \theta_j|$ and $1 + \chi \le 2$, we obtain $|\tilde{W}_j - W^*_j| \le (1 - \chi)(L_W\, \Delta_b + \psi\, M_J)$.

Second step. Since the chosen occupation j^c maximizes $\tilde{W}_j - F_j$, we have $\tilde{W}_{j^*} - \tilde{W}_{j^c} \le F$ (with psychological cost, $F + F_\psi(v)$).

Third step. The loss is decomposed into three segments:

$$\Gamma = \big(W^*_{j^*} - \tilde{W}_{j^*}\big) + \big(\tilde{W}_{j^*} - \tilde{W}_{j^c}\big) + \big(\tilde{W}_{j^c} - W^*_{j^c}\big) \le F + 2(1 - \chi)\big(L_W \Delta_b + \psi M_J\big)$$

With $\chi = 1$ and $F = 0$, $\Gamma \le 0$, and since $\Gamma \ge 0$ by definition, $\Gamma = 0$.

Plasticity limit. When $\pi \to \infty$, the root of f satisfies $(\theta + \tilde{w}\bar{h})(1 - \bar{h}/\kappa) = \delta\bar{h}/\pi \to 0$, so $\bar{h} \to \kappa$, and the time to approach $\bar{h}$ falls as $1/\pi$. By dominated convergence, productive value and contentment do not depend on h_0 in the limit. Anticipated transition tends to $\ln(\kappa/h_0)/(r + \rho_A)$, because the jump in ln h occurs almost immediately and then fades at rate ρ_A. ■

A.6 Proposition 4

With utility $\ln(c - \bar{c}_h) + \psi U$, where U is affect, the marginal rate of substitution is $dc/dU|_W = \psi/(\partial W/\partial c) = \psi(c - \bar{c}_h)$, which tends to zero as $c \to \bar{c}_h$. If a change implies $\Pr(c \leq \bar{c}_h) > 0$ at some instant, the expected utility at that instant is $-\infty$, and so is the decision value. ■

A.7 Proposition 5

(a) If $u_E(t) = \bar{u}$ for all t, since $\dot{H}_E = \rho_E\, u_E = \rho_E\, \bar{u}$ and $\ln c = H_E + \bar{u}$, we have $d \ln c/dt = \rho_E\, \bar{u} \equiv g$, that is, $c(t) = c_0\, e^{gt}$. Consumption exceeds income at $t_0 = \ln(y/c_0)/g$.

(b) While $M \geq 0$, $\dot{M} = r_s\, M + y - c_0 e^{gt}$, whose solution is:

$$M(t) = e^{r_s t}\left[M_0 + \int_0^t e^{-r_s t'}\left(y - c_0 e^{g t'}\right) dt'\right]$$

If $g \geq r_s$, the integral diverges to $-\infty$. If $g < r_s$, the bracket converges to $M_0 + y/r_s - c_0/(r_s - g)$, which is negative under the non-rentier condition. In both cases the bracket becomes negative in finite time, M crosses zero and, with $\dot{M} \leq y - c(t) < 0$ from then on, it reaches $-\bar{D}$ in finite time.

(c) At $-\bar{D}$ the credit constraint forces $c \leq y - r_d\, \bar{D}$. The liquidity available for changing is T_f, and the feasibility condition fails if $T_f < F + D_{tr}\, \max\{0, \bar{c}_h - \varphi_X\, y\} + D_{tr}\, r_d\, \bar{D}$. Leaving $-\bar{D}$ requires $\dot{M} > 0$, that is, $c < y - r_d\, \bar{D}$, which contradicts the compensation rule while $\bar{u} > 0$. ■

A.8 Fractions and aggregate identity (proposition 6)

With fractions f_A, f_Z and f_X, births at rate m enter A and the balance equations are $m + q\, f_X = (\alpha + m)\, f_A$, $\alpha\, f_A = (\varepsilon + m)\, f_Z$ and $\varepsilon\, f_Z = (q + m)\, f_X$. Solving with $f_A + f_Z + f_X = 1$ gives the formulas in the text, and $\partial f_X/\partial \varepsilon = \alpha(\alpha + m)(q + m)/\mathcal{D}^2 > 0$ and $\partial f_X/\partial \alpha = \varepsilon(q + m)(\varepsilon + m)/\mathcal{D}^2 > 0$, verified symbolically.

For the identity, average satisfaction is $\mathbb{E}[s] = \mathbb{E}[\theta] + \lambda_A\, \mu\, \mathbb{E}[\chi \ln(\mathcal{P}^{ag}/\bar{\mathcal{P}})] + \lambda_A\, \mathbb{E}[u_A] + \lambda_E\, \mathbb{E}[u_E]$. The first two terms are direct cross-sectional averages. For the transitions, take a person born at t_0 who dies at t_1, with habits born at her own level. Integrating $\dot{u} = \dot{x} - \rho u$ over her life, jumps included, gives $\int u\, dt = [x(t_1) - x(t_0) - u(t_1)]/\rho$. In a stationary population with births at rate m, the cross-sectional average is m times the expected integral over a lifetime. For the passive component, $\ln c = \ln \Omega + \ln(c/\Omega)$, and on the balanced path $\mathbb{E}[\Delta_{life} \ln \Omega] = g_Y/m$, which gives the term g_Y/ρ_E. Parts (b) and (c) are readings of the identity: the active term depends on the change in $\ln \mathcal{P}^{ag}$ over the lifetime and not on the number of changes, and the level term depends on the $\ln \mathcal{P}^{ag}$ attained, which the direction of changes raises and the capacity lost in each change lowers. ■

A.9 Proposition 7

Let $g_N = \dot{N}/N = \eta N^{\varphi-1} f_\chi$ Bal P, where the weighted mass of explorers, $f_\chi \cdot$ Bal $\cdot$ P, grows at rate n. Then $\dot{g}_N/g_N = (\varphi - 1)g_N + n$, whose unique stable point with $\varphi < 1$ is $g_{N^*} = n/(1-\varphi)$. On the balanced path, $N^{1-\varphi} = \eta\, f_\chi$ Bal P/g_{N^*}, so N is proportional to ${f_\chi}^{1/(1-\varphi)}$. Since output per person is proportional to $N^{1/(\sigma-1)}$, its elasticity with respect to f_χ is $1/((1-\varphi)(\sigma-1))$. For (c), the passive transition associated with the wage index satisfies $\dot{u} = g_Y(t) - \rho_E\, u$. Let g_{Y^*} be the rate of the balanced path. With $z = u - g_{Y^*}/\rho_E$, $z(0) = z(\infty) = 0$ and integrating, $\int z\, dt = \int (g_Y - g_{Y^*})dt/\rho_E = \Delta \ln Y_\infty/\rho_E$. For (d), with preferences compatible with balanced growth, the path of h does not depend on N. ■

A.10 Proposition 8

With a convex cost $C_s(\varepsilon)$, the private condition is ${C_s}'(\varepsilon_p) = \Delta_p$ and the planner's is ${C_s}'(\varepsilon^*) = \Delta_p + E_x$. Since ${C_s}'$ is increasing, $\varepsilon^* > \varepsilon_p$ if and only if $E_x > 0$. Under the rational criterion, more aggregate exploration raises the path of N and that of Y (proposition 7). Each person ignores that effect because her own search does not move N, and she receives no rent for creating, so $E_x > 0$. Part (b) follows from proposition 7(c). Part (c) is numerical: it comes from the simulations of sections 5.5 and 7.3. ■

A.11 Equilibrium and stationary distribution

Equilibrium. The state of the economy is the distribution of people over their individual states, together with N. Those states are occupation, capacity, habits, beliefs, χ, ψ, age and liquidity. An equilibrium is a path of that distribution, of N and of the wage index such that:

- each person chooses effort and changes of occupation as in section 4, and consumes according to section 6.3, given relative pay;
- final-good firms maximize profits and the goods market clears;
- N evolves according to the creation equation;
- the distribution evolves consistently with the decisions.

Lemma 2 (stationary distribution). Consider the balanced path, where the wage index grows at a constant rate g_Y. Suppose that:

(i) the normalized individual state x (occupation, capacity, habits, beliefs, χ, ψ, age and liquidity, with consumption and liquidity measured relative to the wage index) evolves without depending on N;

(ii) each person's path does not depend on the others: the social valuation b_j is a given characteristic of each occupation and the team's mood does not enter effort ($\nu = 0$ or $\beta = 0$), as in the simulations;

(iii) each person dies at a constant rate $m > 0$, independent of her state, and people are born at rate $m + n$, with $n \geq 0$, from a fixed distribution of initial states.

Let Π_s be the law of the state of a person s years after her entry, computed without death, and let Φ_t be the cross-sectional distribution of the population at t. Then:

(a) there exists a unique stationary distribution,

$$\Phi^*(B) = (m+n)\int_0^\infty e^{-(m+n)s}\,\Pi_s(B)\,ds;$$

(b) from any initial distribution, Φ_t converges to Φ^* in total variation, with $\|\Phi_t - \Phi^*\| \leq 2e^{-(m+n)t}$;

(c) the cross-sectional average $\int f\,d\Phi^*$ of a function f of the state is finite if $\int_0^\infty e^{-(m+n)s}\,\mathbb{E}|f(x_s)|\,ds < \infty$. With $\theta > 0$ and bounded normalized income, this holds for capacity, habits, $\ln \mathcal{P}^{ag}$ and $\ln(c/\Omega)$, and it holds for normalized liquidity if $m + n > r_s - g_Y$.

Proof. The population grows at rate n. Of the mass alive at t, the cohort that entered $s \leq t$ ago weighs $(m + n)e^{-(m+n)s}\,ds$: it entered with a weight proportional to $m + n$, survived with probability e^{-ms} and the population grew by e^{ns}. The survivors of the initial population weigh $e^{-(m+n)t}$. Since death does not depend on the state, the state of a cohort's survivors has the law of the process without death. Thus,

$$\Phi_t(B) = e^{-(m+n)t}\,\Phi_t^0(B) + (m+n)\int_0^t e^{-(m+n)s}\,\Pi_s(B)\,ds,$$

where $\Phi^0{}_t$ is the law at t of the state of the survivors of the initial population. Subtracting the formula of (a), $\Phi_t - \Phi^* = e^{-(m+n)t}(\Phi^0{}_t - \Phi^\infty{}_t)$, with $\Phi^\infty{}_t = (m+n)\int_t^\infty e^{-(m+n)(s-t)}\Pi_s\,ds$, which is also a probability. The difference of two probabilities has total variation of at most 2, which gives (b). Φ^* is a probability because $(m+n)\int_0^\infty e^{-(m+n)s}\,ds = 1$; it is stationary because, if $\Phi_0 = \Phi^*$, the formula gives $\Phi_t = \Phi^*$ for all t; and it is unique because every stationary distribution is the limit of Φ_t. By Tonelli's theorem, $\int f\,d\Phi^* = (m+n)\int_0^\infty e^{-(m+n)s}\,\mathbb{E}\,f(x_s)\,ds$, which gives the condition in (c).

The bounds remain. Within an occupation, $h_s \leq \max(h_0, \kappa)$, because $\dot{h} < 0$ when $h > \kappa$, and ln h falls at most at rate δ, because $\dot{h} \geq -\delta h$. Each change of occupation keeps a fixed fraction of capacity (40% in the baseline case), so it subtracts a bounded amount from ln h, and changes arrive at a bounded rate. With $\theta > 0$ effort is at least θ and, with ω bounded away from zero, $\mathbb{E}|\ln \mathcal{P}^{ag}|$ and $\mathbb{E}|\ln(c/\Omega)|$ grow at most linearly with s. Habits are weighted averages of past values of those variables and inherit the bounds. Since $\int_0^\infty s\,e^{-(m+n)s}\,ds$ is finite, their averages are too. Normalized liquidity $\tilde{m} = M/\Omega$ is bounded below by the credit limit and satisfies $d\,\tilde{m}/dt \leq (r_s - g_Y)\tilde{m} + \bar{y}$, where $\bar{y}$ bounds normalized income. That is why it grows at most as $e^{(r_s - g_Y)s}$, and its average is finite if $m + n > r_s - g_Y$. ■

With $n = 0$, (a) is the formula "m times the expected integral over a lifetime" used in the proof of proposition 6: if T is the length of a life, exponential with rate m and independent of the state, $\mathbb{E}\int_0^T f(x_s)\,ds = \int_0^\infty e^{-ms}\,\mathbb{E}\,f(x_s)\,ds$.

Existence of equilibrium. With Φ^* fixed, the mass of explorers weighted by their balance is a constant fraction of the population, which grows at rate n. Proposition 7 then gives a unique path of N starting from N_0, with $g_N \to n/(1-\varphi)$, and the wage index and output follow from the final good. The four conditions of the definition hold by construction: a balanced-path equilibrium exists, unique given the tie-breaking rule for individual decisions. The lemma does not cover the imitation of the team's mood when it moves effort ($\nu > 0$ and $\beta > 0$). With finite teams that form and dissolve independently of the rest, the same argument would apply to teams instead of people, but we do not prove it.

Appendix B. Simulations

The Python code that reproduces all figures accompanies the manuscript as supplementary material, with fixed seeds and a requirements file (numpy, scipy, sympy). The checks of propositions 1 and 2 (B.2) are integrated with an adaptive Runge-Kutta method and a relative tolerance of 10^{-10} (10^{-9} in the check of proposition 3). The individual paths of figure 1 and of tables 2 and 4 use explicit Euler with step 0.005; halving it changes the figures in the text by less than 0.01. The agent simulations, forward-looking effort, proposition 7 and appendix D use step 0.05.

B.1 Baseline parameters. Unless otherwise indicated: $\tilde{w} = 0.5$, $\pi = 0.8$, $\kappa = 10$, $\delta = 0.05$, $\rho_A = 0.2$, $\rho_E = 0.6$, $r = 0.05$, $h_0 = 1$, $\gamma = 0.6$, $\mu = 0.5$, $\bar{\mathcal{P}} = 0.5$ and $\lambda_A = \lambda_E = 1$; when changing occupation, 40% of capacity is kept. The two regimes of ψ are 0.25 and 3.

B.2 Individual results (section 5).

- The identity of proposition 1(c) was compared with the numerical integral of the transition: both equal 10.9737 with $\theta = 1$ and 10.8905 with $\theta = 0.3$.
- Figure 1 uses an aligned occupation ($\omega = 1$, $\kappa = 10$, $\theta = 1$) and a misaligned one ($\omega = 0.4$, $\kappa = 6$, $\theta = 0.3$), with $\lambda_E = 0$ to isolate the active channel, and is integrated with Euler and step 0.005.
- For proposition 2, 300 combinations were drawn, with $\tilde{w}$, π, κ and δ uniform on $[0.05, 1.5]$, $[0.1, 2]$, $[2, 20]$ and $[0.01, 0.3]$ and initial capacity $h_0 = 0.3\kappa \cdot U[0.05, 0.5]$; the 295 in which $h_0 < \bar{h}_L$ were kept. Tastes were θ_L in $[0.05, 1]$ and $\theta_H = \theta_L + U[0.05, 1]$. The gap was hump-shaped in 293, and in 285 its maximum exceeded the final value by at least 1%. The two exceptions combine high forgetting, low pay and low plasticity, and their steady-state level lies at 4% and 14% of κ. The size of the hump grows with closeness to the ceiling: with $\bar{h}$ below 20% of κ, the maximum of the gap barely exceeds its final value, and above 80% it multiplies it by 18 at the median. When the ceiling barely acts, the learning law is almost linear, and with a linear law the gap grows monotonically toward its limit. The baseline case of section 5.3 uses $\theta_H = 1$ and $\theta_L = 0.3$ with the parameters of B.1; its output gap, $h(\theta + \tilde{w}h)$, reaches 16.2 and stabilizes at 7.6, of which 6.2 is the static component. With $\delta = 0$, the capacity gap disappears and the output gap stays at $(\theta_H - \theta_L)\kappa = 7$.
- Forward-looking effort was solved by value function iteration, on a grid of 600 capacity levels and 400 effort levels.

- The mood channel uses $e = \theta + \tilde{w}h + \beta\lambda_A\, u_A$ with $\beta \in \{0, 0.1, 0.2, 0.3\}$ and $\mu = 0$. The level $\bar{h}$ with durable contentment was obtained with $\beta = 0.2$, $\omega = 0.85$, $\kappa = 10$ and $\theta = 0.71$ $(0.6 \cdot 0.85 + 0.2)$.

B.3 Bound of proposition 3. 150 two-occupation cases were generated, with six values of χ (900 checks), and 120 cases with ψ in $[0, 3]$ and five values of χ (600 checks). There were no violations. These checks used a specification with consumption linear in the decision value, instead of the logarithm. The bound is a theorem and holds for any W Lipschitz in taste. The plasticity limit was computed with the logarithmic specification, $\psi = 0$ and $\pi \in \{0.2, 1, 5, 25\}$.

B.4 Trial and error (table 1). The model is in discrete time, with discount factor 0.95. The known occupation yields 1 per period; the alternative yields 1.6 if it is good and 0.5 if it is bad, with prior probability 0.5. Trying it costs 1 for the change and $3/\pi$ for learning, and each period gives a normal signal with standard deviation 0.8. The perceived belief is $\chi p + (1 - \chi)b$, where p is the Bayesian belief and b the social valuation: 0.5 in the case without bias and 0.9 with overvaluation. The decision to return is solved by dynamic programming on a grid of 301 points, with 12-node Gauss-Hermite quadrature. Each cell averages 3,000 paths of 150 periods. The standard error of the mean loss is between 0.05 and 0.11. All cells use the same random numbers, so the comparisons across values of χ are paired, and the order of the losses is repeated with two other seeds.

B.5 Age (table 2). A change from $\omega = 0.55$ and $\kappa = 8$ to $\omega = 0.85$ and $\kappa = 10$ is used, with $\chi = 1$. The parameters are $d_\pi = 0.03$, $d_F = 0.04$, retirement at age 65 and ages from 20 to 63.

B.6 Compensation trap (table 3). The parameters are those of the table, with $r_s = 0.03$, a step of 0.01 years and a 40-year horizon. The exit is considered closed when the feasibility condition of section 6.2 stops holding.

B.7 Entrapment and extraction (section 6.4). Output per producer is $(1 + \kappa_m \sqrt{(f_m/(1 - f_m))})$ times $(1 - \delta_d\, \tau)$, where f_m is the fraction in command, with $\kappa_m = 0.3$ and $\delta_d = 0.6$. The outside option is 0.8 times output without extraction, multiplied by one minus entrapment. The non-pecuniary value of commanding is distributed $N(0, 0.15)$. The equilibrium is obtained by damped iteration on f_m. Those who command can coordinate, which increases the team's output (Garicano, 2000), or extract a share τ of it; extraction alienates and spreads sadness, and its ceiling is the producers' outside option. With entrapment of 0, 0.3 and 0.6, extraction is 0.13, 0.31 and 0.53; the fraction in command, 16%, 33% and 52%, versus an optimum of 2%; and output, 0.88, 0.66 and 0.43, versus a maximum of 1.02.

B.8 Direction of exploration (table 4). A person saturated in an occupation with $\omega = 0.55$ and $\kappa = 8$ evaluates 4,000 offers, with a horizon of 100 and $F = 1$. The offers have ω in $[0.3, 1]$, κ in $[4, 12]$, $\theta = 0.6\omega + U[0, 0.4]$ and a wage premium in $[-0.2, 0.4]$. The social valuation of each offer is the mean of θ plus 0.9 times the centred premium, plus noise $N(0, 0.1)$. The decision value is computed by integrating the paths with the person's beliefs; the true gain, with $\chi = 1$ and the true taste. A change is an offer whose decision value, net of F, exceeds that of staying. The idiosyncratic component of taste, $U[0, 0.4]$, has a smaller range than in B.9.

B.9 Agent simulation (section 7). 5,000 people are simulated with step 0.05 for 700 time units, discarding the first 300, with 3 seeds per case.

- Each person learns with $\pi = 0.6$ and $\delta = 0.05$, and saturates when her capacity grows less than 0.4% per time unit.
- She explores at rate ε, discovers at rate $q = 0.25$, keeps 40% of her capacity when changing and dies at rate 0.02. With scalar capacity, $Bal = 1$; with $\varphi = 1$ and $\eta P = q$, the number of occupations grows at $g_N = q\, f_\chi$ and output per person at $g_N/(\sigma - 1)$, with $\sigma = 3$.
- Upon discovering, she compares six candidate occupations with κ in $[4, 12]$, ω in $[0.3, 1]$, $\theta = 0.6\omega + U[0, 0.72]$ and a wage premium in $[-0.2, 0.4]$. She chooses the one that maximizes the approximation of her decision value:

$$\frac{\ln c_k^{\infty} + \tilde{\theta}_k}{r} + \psi\Big[\chi\lambda_A\Big(\frac{\Delta_k \ln \mathcal{P}^{ag}}{\rho_A + r} + \frac{\mu\chi}{r}\ln\frac{\mathcal{P}_k^{ag,\infty}}{\bar{\mathcal{P}}}\Big) + (1-\chi)\lambda_E\frac{\Delta_k \ln c}{\rho_E + r}\Big]$$

- Here $c^{\infty}{}_k$ and $\mathcal{P}^{ag,\infty}{}_k$ are long-run consumption and potentia agendi in occupation k, and Δ_k the change of their logarithm relative to the current occupation. Effort includes mood with $\beta = 0.2$, and consumption during exploration is 80% of the previous level.
- Realized direction is measured as the change in the logarithm of long-run power, computed with the true taste.
- The error of the aggregate identity was below 0.004 in all cases. The standard deviation of average satisfaction across seeds was 0.003 or less, against changes of 0.057 or more when ε goes from 0.02 to 0.5.

A variant with a single seed and tastes independent of alignment is kept in the supplementary material as a check.

B.10 Increasingly difficult creation (proposition 7). The creation equation is integrated with $\eta = 0.05$, $n = 0.01$, $\varphi = 0.5$ and $\sigma = 3$, starting from the balanced path. The fraction that explores goes from 0.10 to 0.20 at $t = 50$, and the additional passive joy is integrated over 1,500 time units. Doubling the fraction that explores leaves growth of output per person at 1% and doubles its long-run level; the additional passive joy equals 1.157 in the simulation and 1.155 according to the formula of proposition 7(c).

B.11 Endogenous exploration intensity (section 7.3). As in B.9, except that, upon saturating, each person evaluates six offers with the approximation of her decision value and sets $\varepsilon_i = \bar{\varepsilon}\, \Delta_{p,i}/\bar{\Delta}_p$, with a cap of 2. The scale $\bar{\varepsilon}/\bar{\Delta}_p$ is calibrated with a short run and kept fixed for the other values of χ; in the final runs, the mean intensity at saturation with $\chi = 0.5$ is 0.12. The fraction that explores is obtained from growth, $f_\chi = (\sigma - 1)g_Y/q$. The relationship between satisfaction and intensity is measured at the moment of saturation, with experienced satisfaction. The comparisons with a common rate use the runs of B.9 with $\varepsilon = 0.02$ and $\varepsilon = 0.5$. The error of the aggregate identity was below 0.005. Other results of this simulation: with $\psi = 0.25$, the correlations between satisfaction and search intensity are -0.03 ($\chi = 0.2$) and -0.42 ($\chi = 0.9$); with $\psi = 3$, whoever has adequate ideas searches somewhat more upon saturating (0.16 per time

unit with $\chi = 0.9$, versus 0.11 with $\chi = 0.2$), and the share of changes that raise power goes from 74% to 86% in this simulation, with six offers per search, versus 71% and 96% in the 4,000-offer exercise of table 4; with a common rate, about a quarter of the population had to explore to reach a satisfaction of 2.33, albeit with more growth; with $\chi = 0.2$, the advantage of endogenous intensity is smaller (1.40 versus 1.35); and the mean intensity of the saturated is 0.021 to 0.024, versus 0.11 to 0.16 upon saturating.

Appendix C. Vector model

The minimal version in the text is a special case of a model in which each person divides her time among several occupations and accumulates capacities in several dimensions. This appendix presents it and says when the reduction is exact.

Time and production. Person i devotes a fraction $\ell_{ij} \geq 0$ of her time to each occupation j and a fraction ℓ_{i0} to exploring, with $\Sigma_j\, \ell_{ij} + \ell_{i0} = 1$. Her productive capacity in j is $Q_{ij} = z_j\, a_j \cdot k_i$ and her output per unit of time is $Q_{ij}\, e_{ij}$, with effort $e_{ij} = \theta_{ij} + \tilde{w}_j\, Q_{ij} + \beta\lambda_A\, a_i$, where $\tilde{w}_j$ is pay relative to the wage index.

Learning. Each dimension of capacity grows with the time and effort devoted to the occupations that use it:

$$\dot{k}_i^d = \pi_i(v) \sum_j \ell_{ij}\, e_{ij}\, a_j^d \left(1 - \frac{k_i^d}{\kappa_i^d}\right) - \delta\, k_i^d, \qquad d = 1, \ldots, S$$

Powers and affect. The two powers sum over occupations, weighted by time:

$$\mathcal{P}_i^{op} = \sum_j \ell_{ij}\, Q_{ij}\, e_{ij}, \qquad \mathcal{P}_i^{ag} = \sum_j \ell_{ij}\, \omega_{ij}\, Q_{ij}, \qquad s_i = \sum_j \ell_{ij}\theta_{ij} + \lambda_A \left[u_A + \mu\chi_i \ln \frac{\mathcal{P}_i^{ag}}{\bar{\mathcal{P}}}\right] + \lambda_E u_E$$

Habits adapt as in section 4 and beliefs are formed occupation by occupation with the same equation. In this version, the potentia agendi can grow without learning anything, just by moving time toward better aligned occupations, which generalizes corollary 1.

Creation. Whoever explores and discovers creates an occupation whose profile mixes those of two occupations she masters: $a \propto \varpi a_j + (1 - \varpi) a_{j'}$. With probability ζ, the occupation also opens a dimension $S + 1$, and each person receives a ceiling in it drawn from a distribution G. The balance of capacities is measured with $\mathrm{Bal}(k) = \min_d k^d \,/\, \max_d k^d$. An alternative measure based on the entropy of normalized capacities serves as a robustness check.

When the reduction is exact. If the person works in a single occupation and that occupation uses a single dimension d*, then $Q = z\, k^{d^*}$. The learning equation of that dimension gives exactly the minimal version, with $h = Q$, ceiling $z\kappa^{d^*}$ and plasticity $z\pi$. When the occupation uses several dimensions, the dynamics of Q are vectorial: they keep concavity, the ceiling and depreciation, but do not reduce to a single equation. Extending the proofs to the vector case remains pending.

Appendix D. An expanding capacity frontier

Proposition 7 leaves a question open. If new occupations open dimensions of capacity that did not exist before, can that expansion offset the burden of knowledge and give exploration effects on growth back? The expanding frontier does raise the long-run rate, but it does not give χ effects on it back, except in a limiting case.

Let S be the number of capacity dimensions. Each new occupation opens a dimension with probability ζ, and the frontier of attainable capacity grows as $K = S^{\xi}$. Creating an occupation requires a depth that increases with existing occupations, N^{ν_D}. Each explorer's success rate depends on how much the frontier exceeds that requirement, with elasticity λ_F:

$$\dot{N} = \eta \Big(\frac{S^{\xi}}{N^{\nu_D}} \Big)^{\lambda_F} N^{\varphi_0} f_X P, \qquad \dot{S} = \zeta \dot{N}, \qquad \varphi_{ef} = \begin{cases} \varphi_0 - \lambda_F \nu_D & \text{if } \zeta = 0 \\ \varphi_0 + \lambda_F(\xi - \nu_D) & \text{if } \zeta > 0 \end{cases}$$

Proposition D.1 (expanding frontier). If $\varphi_{ef} < 1$:

(a) the number of occupations grows at $n/(1 - \varphi_{ef})$, so opening new dimensions raises the long-run growth rate;

(b) exploration, and with it χ, only moves levels: the elasticity of the number of occupations is $1/(1 - \varphi_{ef})$, larger when the frontier expands;

(c) χ affects the long-run rate only in the limiting case $\varphi_{ef} = 1$ with constant population.

If $\varphi_{ef} > 1$, growth explodes in finite time; avoiding this requires $\xi < \nu_D + (1 - \varphi_0)/\lambda_F$.

Proof. With $\dot{S} = \zeta \dot{N}$, $S = S_0 + \zeta(N - N_0)$, which for large N behaves as ζN if $\zeta > 0$ and is constant if $\zeta = 0$. Substituting, $\dot{N} = \eta \zeta^{\xi \lambda_F} N^{\varphi_{ef}} f_X P (1 + o(1))$, and the argument of appendix A.9 gives parts (a) and (b). If $\varphi_{ef} = 1$ and $n = 0$, g_N is proportional to f_X. If $\varphi_{ef} > 1$, $\dot{N} \propto N^{\varphi_{ef}}$ explodes in finite time. ■

With $\varphi_0 = 1$, $\lambda_F = 1$, $\xi = 0.6$, $\nu_D = 0.8$ and $n = 0.01$, the economy without new dimensions has $\varphi_{ef} = 0.2$ and grows at 0.0125. With $\zeta = 0.3$ it has $\varphi_{ef} = 0.8$ and grows at 0.05, four times faster. In both cases, doubling exploration does not change the rate, but it raises the logarithm of the number of occupations by 0.87 without new dimensions and by 3.47 with them. Two assumptions are not derived from first principles: the form $K = S^{\xi}$ and that the depth requirement grows as a power of N. The magnitude of ζ only moves levels; what moves the rate is that ζ is positive.

Appendix E. Notation

Each symbol has a single meaning in the main text and in the appendices, with two exceptions that the index distinguishes: a_i (with a person index, or without index) is the active affect and a_j (with an occupation index), the occupation's profile; and κ is the vector of ceilings in appendix C and its scalar version in the minimal version.

Symbol	Meaning	Section
i, j, d	Person, occupation, capacity dimension	4.1
κ_i, k_i, a_j	Ceilings, realized capacities, occupation profile	4.1
ω_{ij}	Alignment between person and occupation	4.1
θ_{ij}, γ, ϑ_{ij}	Taste, weight of alignment, idiosyncratic component	4.1
h, κ	Capacity in the occupation and its ceiling (minimal version)	4.1
e, w, Ω, $\tilde{w}$	Effort, pay, wage index, relative pay	4.2
$\pi(v)$, π_0, d_π	Plasticity by age, its level at age 20, its rate of decline	4.2
δ	Forgetting	4.2
v, $T(v)$	Age, remaining working horizon	4.2
$\mathcal{P}^{op}$, $\mathcal{P}^{ag}$	Potentia operandi and potentia agendi	4.3
s	Experienced satisfaction	4.3
u_A, u_E	Active transition and passive transition	4.3
H_A, H_E, ρ_A, ρ_E	Habits and their speeds of adaptation	4.3
λ_A, λ_E	Weights of the channels in satisfaction	4.3
μ, $\bar{\mathcal{P}}$	Weight of durable contentment, normalization	4.3
a, β, ν	Active affect, effect of mood on effort, imitation within the team	4.2 and 4.3
χ	Adequacy of ideas	4.4
b_j	Social valuation of the occupation	4.4
$\hat{\theta}_j$, υ_j, $\tilde{\theta}_j$	Belief, speed of updating, limit belief	4.4
h_0, $\tilde{s}_j$, $\bar{a}$	Initial capacity, signal from experience, team's average affect	4.3, 4.4 and 5.2
ψ	Weight of affective life in the decision	4.4
W_j, W^*_j	Decision value; value under the criterion of the agent guided by reason	4.4
J^A_j, J^E_j, L_j	Anticipated transitions and anticipated contentment	5.4
j_0, j^c, j^*	Current occupation, chosen occupation and best occupation under the rational criterion	4.5 and 5.4
r	Discount rate	4.4
F, $F_\psi(v)$, F_0, d_F	Cost of changing, psychological cost, its level and its growth rate	4.5
c, $\bar{c}$, $\bar{c}_h$, n_d, κ_d	Consumption, subsistence, household subsistence, dependents, weight per dependent	6.1
M, $\bar{D}$, T_f, r_s, r_d	Liquidity, credit limit, family support, return on saving, interest rate on debt	6.2
φ_χ, D_{tr}	Relative income and duration of the transition	6.2
y	The person's income	6.2
ς, $\bar{u}$, φ_c, g	Aspiration gap, passive joy sought, intensity of compensation, consumption growth	6.3
τ	Share of output extracted by the boss	B.7

Symbol	Meaning	Section
Γ, Δ_b, L_W, M_J	Vocational loss, largest social bias, Lipschitz constant, largest difference in affective streams	5.4
B_h, Δ_h	Terms of the formula for $\bar{h}$	5.1
A, Z, X	Phases: learning, saturated, exploring	7.1
f_A, f_Z, f_X, $\mathcal{D}$	Population fractions by phase, common denominator	7.1
α, ε, q, m	Rates of saturation, exploration, discovery and death	7.1
N, η, φ, P, n	Occupations, productivity of creating, difficulty exponent, population, its growth	4.6
$\mathrm{Bal}(k)$, $\mathbb{1}^X_i$	Balance of capacities, exploration indicator	4.6
Y, I_j, L, σ	Output, intermediate good, efficiency units, elasticity of substitution	4.6
g_Y	Growth of output per person	7.2
Δ_{life}, u^{death}	Change of a variable over the lifetime; transition at death	7.2 and A.8
g_{Y^*}, g_N	Growth on the balanced path; growth of the number of occupations	A.9 and B.9
$C_s(\varepsilon)$, Δ_p, $\bar{\Delta}_p$, $\bar{\varepsilon}$, E_x	Search cost, perceived private gain, its mean, mean intensity at saturation (7.1), externality	7.1 and 7.5
ℓ_{ij}, ℓ_{i0}, Q_{ij}, ϖ	Allocation of time, time exploring, productive capacity, recombination weight	C
S, ζ, ξ, ν_D, λ_F, φ_0, φ_{ef}	Dimensions, probability of opening one, frontier exponent, depth exponent, elasticity of success, creation exponents	4.1 and D
Λ, $\iota_0(t)$, ι_s, ι_χ, $\iota_{s\chi}$, ι_M, ι_v, ι_d	Logistic function and coefficients of the exploration duration model	F
f_m, κ_m, δ_d	Fraction in command, coordination gain, loss of effort due to extraction	B.7
U, t'	Affect and integration variable in the proofs	A

Appendix F. Calibration protocol for an organization

This protocol takes the model to a specific organization. It prioritizes what is applicable: short instruments, records that already exist and estimates that a human resources team can replicate. It does not replace a causal design; it organizes what to measure, when and for which parameter.

Table 7. From the model to the organization: what to measure for each parameter.

Block and parameters	What it represents	How it is observed	Instrument or source	How it is estimated
Taste θ and alignment ω	How much the person enjoys her occupation and how much it corresponds to her nature	Satisfaction with the work itself after saturation; meaning of work	"Work itself" facet; short form of the MSQ, intrinsic scale (Weiss, Dawis, England and Lofquist, 1967); WAMI in Spanish (Duarte-Lores, Rolo-González, Suárez and Chinea-Montesdeoca, 2023)	Level of satisfaction after saturation, by occupation, net of contentment λ_A $\mu\chi$ $\ln(\omega\bar{h}/\bar{\mathcal{P}})$ (proposition 1a)
Learning: h, κ, π, δ	Capacity, ceiling, learning speed and forgetting	Productivity by tenure in the task	Operational records (output per hour, cases resolved, sales) and performance evaluations	Fit of the learning equation to the productivity–tenure curve; α is the inverse of the time to saturation
Active transition and contentment: ρ_A, λ_A, $\mu\chi$	How long the joy of learning lasts and how much contentment remains	Satisfaction and mood around each change of tasks	A single global satisfaction item (Wanous, Reichers and Hudy, 1997); mood by experience sampling (Fisher and To, 2012) or day reconstruction (Kahneman et al., 2004); boredom (Reijseger et al., 2013)	Area of the hump plus the contentment still to accumulate, equal to λ_A $\ln(\bar{h}/h_0)/\rho_A$ (proposition 1c; F.5); final level, $\theta + \lambda_A$ $\mu\chi$ $\ln(\omega\bar{h}/\bar{\mathcal{P}})$
Passive transition: ρ_E, λ_E	Adaptation to pay	Pay satisfaction before and after each raise	Payroll and pay facet	Response of the facet to each raise and speed at which it fades
Adequacy χ and social valuation b_j	Whether the person predicts well what satisfies her; status of each occupation	Predicted versus realized satisfaction; third-party ratings	Prediction task (F.9); self-concept clarity as support (Spanish version by Molina and Iribarne, 2021); occupational prestige (Treiman, 1977; Ganzeboom, De Graaf and Treiman, 1992)	Nonlinear regression of the prediction on realized satisfaction, net of contentment, and on b_j, with control tasks (F.9)

Block and parameters	What it represents	How it is observed	Instrument or source	How it is estimated
Weight of affective life ψ	How much pay is sacrificed for growth or for meaning	Choices between offers	Minimum acceptable wage for offers that differ in learning and meaning (as in Hu and Hirsh, 2017) or a choice experiment	Marginal rate of substitution between pay and growth; identifies the "money as a purpose" type
Mood and effort: β, ν	How much mood moves performance and how much it spreads	Daily mood and daily productivity	Mood pulses; daily records; mood shocks such as the weather (Bellet et al., 2024)	Regression of productivity on one's own and the team's mood, with mood shocks as an instrument
Exploration: $\bar{\varepsilon}$ and its determinants	How much saturation pushes toward search	Search outside and inside, from saturation	DANE questions on the wish to change jobs and steps taken; turnover intention, TIS-6 (Bothma and Roodt, 2013); job crafting (Tims et al., 2012; Sora, Caballer and García-Buades, 2018); internal applications and voluntary exits	Duration model from saturation with satisfaction, χ, their interaction, liquidity, dependents and age
Costs of changing: F, $F_{\psi}(v)$	What it costs to move	Time to full productivity after a change	Performance records after internal moves	Output loss in the first months; age gradient
Subsistence and liquidity: $\bar{c}_h$, n_d, M, $\bar{D}$, T_f	Room to change	Financial well-being, dependents, debt, family support	5- or 10-item financial well-being scale, with a Spanish version (Consumer Financial Protection Bureau, 2015)	Feasibility condition of section 6.2, person by person
Compensation: φ_c, ς	Consumption to cover the lack of active joy	Status consumption and the path of debt	Status consumption scale (Eastman, Goldsmith and Flynn, 1999); materialism (Richins and Dawson, 1992); payroll deductions for credit, with consent	Time t_0 of proposition 5

Block and parameters	What it represents	How it is observed	Instrument or source	How it is estimated
Extraction τ	What the boss extracts	Abusive supervision; rating of the boss by the team	Tepper (2000) scale; survey on the boss's management skills, which is related to turnover (Hoffman and Tadelis, 2021)	Section 6.4
Aggregate: q, φ, η	Discovery and creation of occupations	Time to find an occupation; creation of new positions and tasks	Vacancies and catalogue of positions; nationally, PILA-based records (DANE, 2025; Morales and Medina, 2019)	q, with the transition rates between phases; φ and η are not identified within an organization (section 9)

F.1 Units, horizon and ethics. An occupation is a stable set of tasks, for example a position within a department. We propose following people for at least one year, to observe a full learning cycle in occupations with a short curve, and longer in those with a long curve. Questions about personal finances, consumption and the boss are sensitive. They require informed consent, pseudonymized data and that whoever analyzes is not whoever evaluates performance.

F.2 Baseline. Applied once:

- global satisfaction, with one item, and by facets: work itself, pay, security, use of initiative and hours, the facets of Clark (2001);
- meaning of work (WAMI, 10 items, in the Spanish version of Duarte-Lores et al., 2023), engagement (UWES-9; Schaufeli, Bakker and Salanova, 2006) and boredom (six items; Reijseger et al., 2013);
- turnover intention (TIS-6) and search in the last four weeks;
- financial well-being (five items), dependents, debt and family support;
- status consumption and materialism;
- abusive supervision and rating of the boss;
- the prediction task for χ and the minimum acceptable wage questions for ψ.

F.3 Monthly pulse. Four questions: global satisfaction, mood on the last working day, how much the person learned in the month and whether she looked for another occupation, inside or outside the organization, in the last four weeks.

F.4 Records. Productivity by person and task; start date in each task; internal moves, vacancies and applications; voluntary and involuntary exits; payroll; absenteeism; and, with consent, payroll deductions for credit.

F.5 Estimation in five steps.

1. **Learning curve by occupation.** The learning equation is fitted to productivity by tenure in the task. This yields κ, π, δ, $\bar{h}$, the time to saturation (and with it α) and each person's saturation date.
2. **Affect.** Around each change of tasks, the satisfaction hump is fitted: its area, plus the contentment still to accumulate, $\lambda_A\ \mu\chi\int\ln(\bar{h}/h)dt$, equals $\lambda_A\ \ln(\bar{h}/h_0)/\rho_A$ and gives ρ_A; its final level gives $\theta + \lambda_A\ \mu\chi\ \ln(\omega\bar{h}/\bar{\mathcal{P}})$. Pay changes around the change of tasks are controlled for, so as not to confuse the passive channel with the active one. The response of the pay facet to each raise gives ρ_E.
3. **Beliefs.** χ_i and b_j come from the prediction task and from third-party ratings (F.9).
4. **Exploration.** A discrete-time duration model is estimated from the saturation date. The intensity at saturation, $\bar{\varepsilon}$, is the estimated rate at the start of the period.
5. **Simulation.** The parameters feed the code of the supplementary material to compare policies: guidance and task trials (raise χ), transition support (raise M or T_f), internal mobility (lowers F) and limits on extraction (lower τ).

The duration model of step 4 is:

$$\Pr(\text{search}_{it} = 1 \mid \text{has not searched}) = \Lambda\left(\iota_0(t) + \iota_s s_{it} + \iota_\chi \chi_i + \iota_{s\chi}\, s_{it}\chi_i + \iota_M M_i + \iota_v v_i + \iota_d n_{d,i}\right)$$

Here $\iota_0(t)$ captures the time since saturation, s_{it} is satisfaction in the last pulse, M_i financial slack measured with the financial well-being scale, v_i age, $n_{d,i}$ dependents and Λ the logistic function. The model predicts $\iota_s < 0$, $\iota_{s\chi} < 0$, $\iota_M > 0$, $\iota_v < 0$ and $\iota_d < 0$; it does not determine the sign of ι_χ.

F.6 Validation. Exits and internal moves are predicted out of sample, and predictions 1 and 8 are tested: the area of the hump by task distance and the gradient of search by χ.

F.7 Minimal version. A small organization can start with four pieces: the monthly pulse, the work-itself facet, the short financial well-being scale and the records of productivity, tenure and exits. With these, the learning curve, the hump, exploration intensity and its relationship with satisfaction can be estimated. χ and ψ are not estimated, as they require the prediction task and the choice questions.

F.8 What the protocol does not allow. Steps 2 and 4 give associations. Causal effects require exogenous variation, such as randomly assigning task trials or a guidance programme (F.9). With few people per occupation, it is advisable to group occupations with similar tasks. The magnitudes in the main text do not replace this calibration.

F.9 Measurements that require more care. This subsection details the three measurements summarized in section 8.2 and the available data sources.

How to separate the facets. Among the facets that predict quits are security, pay, use of initiative, the work itself and hours (Clark, 2001). The work itself and initiative approximate the active channel; pay and security, the passive one. Satisfaction questions measure an evaluation, not the flow of affect, so this correspondence is approximate.

How to measure χ. At the end of a short trial of a task, when her belief has already incorporated the experience, the person predicts her satisfaction with it once she masters it. After saturation, when the transition has already faded, realized satisfaction s_{ij} is measured. By proposition 1(a), that satisfaction includes contentment, so taste is $\theta_{ij} = s_{ij} - \lambda_A \, \mu\chi_i \ln(\mathcal{P}^{ag}{}_{ij}/\bar{\mathcal{P}})$. By the belief equation:

$$\text{prediction}_{ij} = \chi_i \, \theta_{ij} + (1 - \chi_i) \, b_j + \text{bias}_i + \text{error}_{ij}$$

Since θ_{ij} depends on χ_i through contentment, the equation is estimated by nonlinear least squares, with $\ln \mathcal{P}^{ag}{}_{ij}$ approximated from the learning curve of the task (F.5, step 1). The term bias_i captures a common forecasting bias of each person. People exaggerate how much their future tastes will resemble their current ones (Loewenstein, O'Donoghue and Rabin, 2003), and that bias could be confused with $\chi < 1$. The measurement we propose has four pieces:

1. **Randomly assign task trials**, so that θ is also observed in tasks the person would not have chosen.
2. **Measure b_j with third-party ratings** of the status and desirability of each task, not with the person's own.
3. **Include control tasks** with neutral social valuation, which identify bias_i separately from χ_i.
4. **Preregister the analysis.** A randomly assigned guidance programme would also give exogenous variation in χ to test propositions 5 and 8.

How to measure exploration. There are two ways of exploring: searching outside and searching inside. Searching outside is measured with questions such as those of DANE's household survey, which asks employed people whether they wish to change jobs, for what reasons and whether they took steps to change in the last four weeks (DANE, Archivo Nacional de Datos, n.d.), or with turnover intention scales (Bothma and Roodt, 2013). Searching inside is measured with records of applications to internal vacancies and with the challenging-demands dimension of the job crafting scale (Tims et al., 2012), which has a short version in Spanish (Sora et al., 2018). The intensity $\bar{\varepsilon}$ is estimated with a duration model whose clock starts at the saturation date, which comes from the learning curve of each occupation, and not with the average of a cross-sectional survey (section 8.2 and appendix B.11). The model anticipates the sign of each determinant: search rises with dissatisfaction, more so the higher χ is (prediction 8), and falls near subsistence, without liquidity (proposition 4 and section 6.2) and with age (section 5.6).

Data. Panels that follow the same people with facet-level satisfaction measures allow tests 1, 2, 5, 6, 7 and 8, like those used by Grund and Sliwka (2007) and by Clark (2001). In Colombia, the National Quality of Life Survey (Encuesta Nacional de Calidad de Vida) measures satisfaction with work or activity and, separately, with income, on a scale from 0 to 10 (DANE, 2026). The satisfaction of people aged 15 and over with their work or activity has stayed between 7.0 and 7.4 between 2019 and 2025. That pair allows a first descriptive test of prediction 7 across departments, although it does not precisely separate the two channels. Changes of employer in the formal sector can be followed with DANE's register of employment relationships, which is based on the

social security contributions form, PILA (DANE, 2025). Those records have already been used to measure the fluidity of the Colombian labour market (Morales and Medina, 2019).

References

Acemoglu, D., & Wolitzky, A. (2011). The economics of labor coercion. *Econometrica*, 79(2), 555–600. https://doi.org/10.3982/ECTA8963

Adams, A., Huttunen, K., Nix, E., & Zhang, N. (2024). The dynamics of abusive relationships. *The Quarterly Journal of Economics*, 139(4), 2135–2180.

Akerlof, G. A., Rose, A. K., & Yellen, J. L. (1988). Job switching and job satisfaction in the U.S. labor market. *Brookings Papers on Economic Activity*, 1988(2), 495–594. https://www.brookings.edu/bpea-articles/job-switching-and-job-satisfaction-in-the-u-s-labor-market/

Bellet, C. S., De Neve, J.-E., & Ward, G. (2024). Does employee happiness have an impact on productivity? *Management Science*, 70(3), 1656–1679. https://doi.org/10.1287/mnsc.2023.4766

Bénabou, R., & Tirole, J. (2003). Intrinsic and extrinsic motivation. *Review of Economic Studies*, 70(3), 489–520. https://doi.org/10.1111/1467-937X.00253

Benjamin, D. J., Heffetz, O., Kimball, M. S., & Rees-Jones, A. (2012). What do you think would make you happier? What do you think you would choose? *American Economic Review*, 102(5), 2083–2110.

Besley, T., & Ghatak, M. (2005). Competition and incentives with motivated agents. *American Economic Review*, 95(3), 616–636. https://doi.org/10.1257/0002828054201413

Böckerman, P., & Ilmakunnas, P. (2009). Job disamenities, job satisfaction, quit intentions, and actual separations: Putting the pieces together. *Industrial Relations*, 48(1), 73–96.

Böckerman, P., & Ilmakunnas, P. (2012). The job satisfaction-productivity nexus: A study using matched survey and register data. *Industrial and Labor Relations Review*, 65(2), 244–262. https://doi.org/10.1177/001979391206500203

Boswell, W. R., Boudreau, J. W., & Tichy, J. (2005). The relationship between employee job change and job satisfaction: The honeymoon-hangover effect. *Journal of Applied Psychology*, 90(5), 882–892. https://doi.org/10.1037/0021-9010.90.5.882

Bothma, C. F. C., & Roodt, G. (2013). The validation of the turnover intention scale. *SA Journal of Human Resource Management*, 11(1), a507. https://doi.org/10.4102/sajhrm.v11i1.507

Burbano, V. C. (2016). Social responsibility messages and worker wage requirements: Field experimental evidence from online labor marketplaces. *Organization Science*, 27(4), 1010–1028. https://doi.org/10.1287/orsc.2016.1066

Carroll, C. D., Overland, J., & Weil, D. N. (2000). Saving and growth with habit formation. *American Economic Review*, 90(3), 341–355. https://doi.org/10.1257/aer.90.3.341

Cassar, L., & Meier, S. (2018). Nonmonetary incentives and the implications of work as a source of meaning. *Journal of Economic Perspectives*, 32(3), 215–238. https://doi.org/10.1257/jep.32.3.215

Chadi, A., & Hetschko, C. (2018). The magic of the new: How job changes affect job satisfaction. *Journal of Economics & Management Strategy*, 27(1), 23–39. https://doi.org/10.1111/jems.12217

Chetty, R. (2008). Moral hazard versus liquidity and optimal unemployment insurance. *Journal of Political Economy*, 116(2), 173–234.

Christensen, B. J., Lentz, R., Mortensen, D. T., Neumann, G. R., & Werwatz, A. (2005). On-the-job search and the wage distribution. *Journal of Labor Economics*, 23(1), 31–58. https://doi.org/10.1086/425432

Clark, A. E. (2001). What really matters in a job? Hedonic measurement using quit data. *Labour Economics*, 8(2), 223–242.

Clark, A. E., Diener, E., Georgellis, Y., & Lucas, R. E. (2008). Lags and leads in life satisfaction: A test of the baseline hypothesis. *Economic Journal*, 118, F222–F243.

Clark, A. E., Georgellis, Y., & Sanfey, P. (1998). Job satisfaction, wage changes and quits: Evidence from Germany. *Research in Labor Economics*, 17, 95–121.

Consumer Financial Protection Bureau (2015). *Measuring financial well-being: A guide to using the CFPB Financial Well-Being Scale*. https://files.consumerfinance.gov/f/201512_cfpb_financial-well-being-user-guide-scale.pdf

Csikszentmihalyi, M. (1975). *Beyond boredom and anxiety*. Jossey-Bass.

Cunha, F., & Heckman, J. J. (2007). The technology of skill formation. *American Economic Review*, 97(2), 31–47.

DANE (2025). *Actualización de la clasificación sectorial en el RELAB* [Update of the sectoral classification in RELAB]. Departamento Administrativo Nacional de Estadística. https://www.dane.gov.co/files/operaciones/RELAB/doc-actualizacion-clasificacion-relab.pdf

DANE (2026). *Encuesta Nacional de Calidad de Vida (ECV) 2025* [National Quality of Life Survey (ECV) 2025]. Technical bulletin. Departamento Administrativo Nacional de Estadística. https://www.dane.gov.co/files/operaciones/ECV/bol-ECV-2025.pdf

DANE, Archivo Nacional de Datos (n.d.). Gran Encuesta Integrada de Hogares 2009 [Integrated Household Survey 2009], variable P7130 (https://microdatos.dane.gov.co/index.php/catalog/207/variable/F5/V283); GEIH 2007, fourth quarter, variable P7140 (https://microdatos.dane.gov.co/index.php/catalog/317/variable/F85/V5187); Medición de Pobreza Monetaria y Desigualdad 2025 [Monetary Poverty and Inequality Measurement 2025], variable P7150 (https://microdatos.dane.gov.co/index.php/catalog/908/variable/F7/V409). Accessed October 2026.

De Neve, J.-E., Ward, G., De Keulenaer, F., Van Landeghem, B., Kavetsos, G., & Norton, M. I. (2018). The asymmetric experience of positive and negative economic growth: Global evidence using subjective well-being data. *Review of Economics and Statistics*, 100(2), 362–375.

Delfgaauw, J., & Dur, R. (2007). Signaling and screening of workers' motivation. *Journal of Economic Behavior & Organization*, 62(4), 605–624. https://doi.org/10.1016/j.jebo.2005.04.017

Diriwächter, P., & Shvartsman, E. (2018). The anticipation and adaptation effects of intra- and interpersonal wage changes on job satisfaction. *Journal of Economic Behavior & Organization*, 146, 116–140. https://doi.org/10.1016/j.jebo.2017.12.010

Dittmar, H., Bond, R., Hurst, M., & Kasser, T. (2014). The relationship between materialism and personal well-being: A meta-analysis. *Journal of Personality and Social Psychology*, 107(5), 879–924.

Dixit, A. K., & Stiglitz, J. E. (1977). Monopolistic competition and optimum product diversity. *American Economic Review*, 67(3), 297–308.

Duarte-Lores, I., Rolo-González, G., Suárez, E., & Chinea-Montesdeoca, C. (2023). Meaningful work, work and life satisfaction: Spanish adaptation of Work and Meaning Inventory Scale. *Current Psychology*, 42(14), 12151–12163. https://doi.org/10.1007/s12144-021-02569-8

Easterlin, R. A., McVey, L. A., Switek, M., Sawangfa, O., & Zweig, J. S. (2010). The happiness–income paradox revisited. *Proceedings of the National Academy of Sciences*, 107(52), 22463–22468. https://doi.org/10.1073/pnas.1015962107

Eastman, J. K., Goldsmith, R. E., & Flynn, L. R. (1999). Status consumption in consumer behavior: Scale development and validation. *Journal of Marketing Theory and Practice*, 7(3), 41–52. https://doi.org/10.1080/10696679.1999.11501839

Engeser, S., & Rheinberg, F. (2008). Flow, performance and moderators of challenge-skill balance. *Motivation and Emotion*, 32, 158–172. https://doi.org/10.1007/s11031-008-9102-4

Faberman, R. J., Mueller, A. I., Şahin, A., & Topa, G. (2022). Job search behavior among the employed and non-employed. *Econometrica*, 90(4), 1743–1779. https://doi.org/10.3982/ECTA18582

Field, S. L. (2020). *Potentia: Hobbes and Spinoza on power and popular politics*. Oxford University Press.

Fisher, C. D., & To, M. L. (2012). Using experience sampling methodology in organizational behavior. *Journal of Organizational Behavior*, 33(7), 865–877. https://doi.org/10.1002/job.1803

Freeman, R. B. (1978). Job satisfaction as an economic variable. *American Economic Review*, 68(2), 135–141.

Ganzeboom, H. B. G., De Graaf, P. M., & Treiman, D. J. (1992). A standard international socio-economic index of occupational status. *Social Science Research*, 21(1), 1–56. https://doi.org/10.1016/0049-089X(92)90017-B

Garicano, L. (2000). Hierarchies and the organization of knowledge in production. *Journal of Political Economy*, 108(5), 874–904.

Gathmann, C., & Schönberg, U. (2010). How general is human capital? A task-based approach. *Journal of Labor Economics*, 28(1), 1–49.

Geana, A., Wilson, R. C., Daw, N., & Cohen, J. D. (2016). Boredom, information-seeking and exploration. *Proceedings of the Annual Meeting of the Cognitive Science Society*, 38. https://escholarship.org/uc/item/4rg9267w

Gibbs, M. (2021). Job design, learning and intrinsic motivation. *IZA Discussion Paper* 14285.

Glaeser, E. L., Sacerdote, B. I., & Scheinkman, J. A. (2003). The social multiplier. *Journal of the European Economic Association*, 1(2–3), 345–353. https://doi.org/10.1162/154247603322390982

Green, F. (2010). Well-being, job satisfaction and labour mobility. *Labour Economics*, 17(6), 897–903. https://doi.org/10.1016/j.labeco.2010.04.002

Griffeth, R. W., Hom, P. W., & Gaertner, S. (2000). A meta-analysis of antecedents and correlates of employee turnover: Update, moderator tests, and research implications for the next millennium. *Journal of Management*, 26(3), 463–488. https://doi.org/10.1177/014920630002600305

Grund, C., & Sliwka, D. (2007). Reference-dependent preferences and the impact of wage increases on job satisfaction: Theory and evidence. *Journal of Institutional and Theoretical Economics*, 163(2), 313–335. https://doi.org/10.1628/093245607781261351

Heidhues, P., Kőszegi, B., & Strack, P. (2018). Unrealistic expectations and misguided learning. *Econometrica*, 86(4), 1159–1214. https://doi.org/10.3982/ECTA14084

Hidalgo, C. A., & Hausmann, R. (2009). The building blocks of economic complexity. *Proceedings of the National Academy of Sciences*, 106(26), 10570–10575. https://doi.org/10.1073/pnas.0900943106

Hoffman, M., & Tadelis, S. (2021). People management skills, employee attrition, and manager rewards: An empirical analysis. *Journal of Political Economy*, 129(1), 243–285. https://doi.org/10.1086/711409

Hu, J., & Hirsh, J. B. (2017). Accepting lower salaries for meaningful work. *Frontiers in Psychology*, 8, 1649. https://doi.org/10.3389/fpsyg.2017.01649

Jones, B. F. (2009). The burden of knowledge and the "death of the Renaissance man": Is innovation getting harder? *Review of Economic Studies*, 76(1), 283–317. https://doi.org/10.1111/j.1467-937X.2008.00531.x

Jones, C. I. (1995). R&D-based models of economic growth. *Journal of Political Economy*, 103(4), 759–784. https://doi.org/10.1086/262002

Jones, C. I. (2023). Recipes and economic growth: A combinatorial march down an exponential tail. *Journal of Political Economy*, 131(8), 1994–2031. https://doi.org/10.1086/723631

Jones, C. I., & Williams, J. C. (2000). Too much of a good thing? The economics of investment in R&D. *Journal of Economic Growth*, 5(1), 65–85.

Jovanovic, B. (1979). Job matching and the theory of turnover. *Journal of Political Economy*, 87(5), 972–990.

Kahneman, D., Krueger, A. B., Schkade, D. A., Schwarz, N., & Stone, A. A. (2004). A survey method for characterizing daily life experience: The day reconstruction method. *Science*, 306(5702), 1776–1780. https://doi.org/10.1126/science.1103572

Kahneman, D., Wakker, P. P., & Sarin, R. (1997). Back to Bentham? Explorations of experienced utility. *Quarterly Journal of Economics*, 112(2), 375–406.

Kasser, T., & Ryan, R. M. (1993). A dark side of the American dream: Correlates of financial success as a central life aspiration. *Journal of Personality and Social Psychology*, 65(2), 410–422. https://doi.org/10.1037/0022-3514.65.2.410

Kőszegi, B. (2006). Ego utility, overconfidence, and task choice. *Journal of the European Economic Association*, 4(4), 673–707.

Kristensen, N., & Westergård-Nielsen, N. (2006). Job satisfaction and quits – Which job characteristics matters most? *Nationaløkonomisk Tidsskrift*, 2006(1), 230–248.

Lazear, E. P. (2005). Entrepreneurship. *Journal of Labor Economics*, 23(4), 649–680. https://doi.org/10.1086/491605

Lévy-Garboua, L., Montmarquette, C., & Simonnet, V. (2007). Job satisfaction and quits. *Labour Economics*, 14(2), 251–268. https://doi.org/10.1016/j.labeco.2005.08.003

Loewenstein, G., O'Donoghue, T., & Rabin, M. (2003). Projection bias in predicting future utility. *Quarterly Journal of Economics*, 118(4), 1209–1248. https://doi.org/10.1162/003355303322552784

Lordon, F. (2014). *Willing slaves of capital: Spinoza and Marx on desire* (G. Ash, Trans.). Verso.

Maestas, N., Mullen, K. J., Powell, D., von Wachter, T., & Wenger, J. B. (2023). The value of working conditions in the United States and implications for the structure of wages. *American Economic Review*, 113(7), 2007–2047. https://doi.org/10.1257/aer.20190846

Miller, R. A. (1984). Job matching and occupational choice. *Journal of Political Economy*, 92(6), 1086–1120.

Molina, M. F., & Iribarne, K. (2021). Adaptación de la Escala de Claridad en el Autoconcepto. Un estudio en estudiantes universitarios argentinos [Adaptation of the Self-Concept Clarity Scale: A study with Argentine university students]. *Revista de Psicología*, 30(2), 1–14. https://doi.org/10.5354/0719-0581.2021.54510

Morales, L. F., & Medina, D. (2019). Labour market fluidity and employment outcomes in Colombia: Evidence from employer-employee linked data. *CEPAL Review*, 127, 110–130.

Oswald, A. J., Proto, E., & Sgroi, D. (2015). Happiness and productivity. *Journal of Labor Economics*, 33(4), 789–822. https://doi.org/10.1086/681096

Papageorgiou, T. (2014). Learning your comparative advantages. *Review of Economic Studies*, 81(4), 1263–1295. https://doi.org/10.1093/restud/rdt048

Reijseger, G., Schaufeli, W. B., Peeters, M. C. W., Taris, T. W., van Beek, I., & Ouweneel, E. (2013). Watching the paint dry at work: Psychometric examination of the Dutch Boredom Scale. *Anxiety, Stress & Coping*, 26(5), 508–525. https://doi.org/10.1080/10615806.2012.720676

Richins, M. L., & Dawson, S. (1992). A consumer values orientation for materialism and its measurement: Scale development and validation. *Journal of Consumer Research*, 19(3), 303–316. https://doi.org/10.1086/209304

Rosen, S. (1986). The theory of equalizing differences. In *Handbook of Labor Economics*, vol. 1, ch. 12, 641–692. Elsevier.

Rothschild, M. (1974). A two-armed bandit theory of market pricing. *Journal of Economic Theory*, 9(2), 185–202.

Rucker, D. D., & Galinsky, A. D. (2008). Desire to acquire: Powerlessness and compensatory consumption. *Journal of Consumer Research*, 35(2), 257–267.

Schaufeli, W. B., Bakker, A. B., & Salanova, M. (2006). The measurement of work engagement with a short questionnaire: A cross-national study. *Educational and Psychological Measurement*, 66(4), 701–716. https://doi.org/10.1177/0013164405282471

Schmitter, A. M. (2021). 17th and 18th century theories of emotions: Supplement on Spinoza. In *Stanford Encyclopedia of Philosophy* (Summer 2021 Edition). https://plato.stanford.edu/archives/sum2021/entries/emotions-17th18th/LD5Spinoza.html

Shapiro, C., & Stiglitz, J. E. (1984). Equilibrium unemployment as a worker discipline device. *American Economic Review*, 74(3), 433–444.

Smith, B. (2025). Spinoza's dual pleasure problem. *Journal of Spinoza Studies*, 4(2). https://doi.org/10.21827/jss.4.2.42233

Sora, B., Caballer, A., & García-Buades, E. (2018). Validation of a short form of Job Crafting Scale in a Spanish sample. *The Spanish Journal of Psychology*, 21, E51. https://doi.org/10.1017/sjp.2018.52

Spinoza, B. (1909). *The chief works of Benedict de Spinoza, vol. 2: On the improvement of the understanding; The ethics; Correspondence* (R. H. M. Elwes, Trans.; Rev. ed.). G. Bell. (Original work published 1677)

Stevenson, B., & Wolfers, J. (2008). Economic growth and subjective well-being: Reassessing the Easterlin paradox. *Brookings Papers on Economic Activity*, 2008(1), 1–87.

Tepper, B. J. (2000). Consequences of abusive supervision. *Academy of Management Journal*, 43(2), 178–190. https://doi.org/10.5465/1556375

Tims, M., Bakker, A. B., & Derks, D. (2012). Development and validation of the job crafting scale. *Journal of Vocational Behavior*, 80(1), 173–186. https://doi.org/10.1016/j.jvb.2011.05.009

Topel, R. H., & Ward, M. P. (1992). Job mobility and the careers of young men. *Quarterly Journal of Economics*, 107(2), 439–479. https://doi.org/10.2307/2118478

Treiman, D. J. (1977). *Occupational prestige in comparative perspective*. Academic Press.

Viljanen, V. (2009). Spinoza's actualist model of power. In J. Pietarinen & V. Viljanen (Eds.), *The world as active power: Studies in the history of European reason* (pp. 213–228). Brill. https://philarchive.org/rec/VILSAM

Villalba Arango, R. S. (in preparation). *Potentia y potestas*.

Wanous, J. P., Reichers, A. E., & Hudy, M. J. (1997). Overall job satisfaction: How good are single-item measures? *Journal of Applied Psychology*, 82(2), 247–252. https://doi.org/10.1037/0021-9010.82.2.247

Weiss, D. J., Dawis, R. V., England, G. W., & Lofquist, L. H. (1967). *Manual for the Minnesota Satisfaction Questionnaire* (Minnesota Studies in Vocational Rehabilitation, 22). Industrial Relations Center, University of Minnesota. Short form available at https://vpr.psych.umn.edu/node/26

Weitzman, M. L. (1998). Recombinant growth. *Quarterly Journal of Economics*, 113(2), 331–360. https://doi.org/10.1162/003355398555595

Wrzesniewski, A., & Dutton, J. E. (2001). Crafting a job: Revisioning employees as active crafters of their work. *Academy of Management Review*, 26(2), 179–201. https://doi.org/10.5465/amr.2001.4378011