Creative Destruction and Subjective Wellbeing*

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Abstract

In this paper we analyze the relationship between turnover-driven growth and subjective wellbeing, using cross-sectional MSA level US data. We find that the effect of creative destruction on wellbeing is (i) unambiguously positive if we control for MSA-level unemployment, less so if we do not; (ii) more positive on future wellbeing than on current well-being; (iii) more positive in MSAs with faster growing industries or with industries that are less prone to outsourcing; (iv) more positive in MSAs within states with more generous unemployment insurance policies.

JEL Codes: I31, J63, J65, O33, O38, Z19

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1 Introduction

Does higher (per capita) GDP or GDP growth increase happiness? The existing empirical literature on happiness and income looks at how various measures of subjective wellbeing relate to income or income growth, but without going into further details of what drives the growth process.

In his 1974 seminal work, Richard Easterlin provides evidence to the effect that, within a given country, happiness is positively correlated with income across individuals but this correlation no longer holds within a given country over time.[1] This Easterlin paradox is often explained by the idea that, at least past a certain income threshold, additional income enters life satisfaction only in a relative way;[2] Clark *et al.* (2008) provided a review of this large literature of which Luttmer (2005), Clark and Senik (2010), and Card *et al.* (2012) are prominent examples. Recent work has found little evidence of thresholds and a good deal of evidence linking higher incomes to higher life satisfaction, both across countries and over time. Thus in his cross-country analysis of the Gallup World Poll, Deaton (2008) finds a relationship between log of per capita GDP and life satisfaction which is positive and close to linear, i.e. with a similar slope for poor and rich countries, and if anything steeper for rich countries. Stevenson and Wolfers (2013) provide both cross-country and within-country evidence of a log-linear relationship between per capita GDP and wellbeing and they also fail to find a critical "satiation" income threshold.[3] Yet these issues remain far from settled, see for example the reviews by Frey and Stutzer (2002), Layard (2005) or Graham (2012) as well as the new work investigating how happiness measures relate to economists' notions of utility (e.g. see Benjamin *et al.,* 2012). Importantly, however, none of these contributions looks into the determinants of growth and at how these determinants affect wellbeing. In this paper, we provide a first attempt at filling this gap.

More specifically, we look at how an important engine of growth, namely Schumpeterian creative destruction with its resulting flow of entry and exit of firms and jobs, affects subjective wellbeing differently for different types of individuals and in different types of labor markets.

Thus, in the first part of the paper we develop a simple Schumpeterian model of growth and unemployment to organize our thoughts and generate predictions on the potential effects of turnover

[1] Easterlin's results have been much debated. Even the importance of income to explain life satisfaction variation across individuals has been sometimes qualified. Blanchflower and Oswald (2004) argue that life events such as unemployment or marital status have larger effects than income. Di Tella et al (2007) show that the effect of an income shock on life satisfaction is only temporary: 65% of the effect disappears within four years.

[2] In other words, provided you can fulfill basic needs, what really matters for happiness is to be richer than one's neighbors or reference person.

[3] Interestingly, Deaton and Stone (2013) show that income impacts differently different measures of wellbeing but argue that relative income and wellbeing remains a puzzle of the literature. They distinguish between hedonic wellbeing ("did you experience a lot of happiness yesterday?), which could be consistent with a relative income story, and evaluative wellbeing (as measured by how individuals assess their lives on a 0 to 10 ladder), which is more closely related to absolute income.

on life satisfaction. In this model growth results from quality-improving innovations. Each time a new innovator enters a sector, the worker currently employed in that sector loses her job and the firm posts a new vacancy. Production in the sector resumes with the new technology only when the firm has found a new suitable worker. Life satisfaction is proxied by the expected discounted valuation of an individual's future earnings. In the model a higher rate of turnover has both direct and indirect effects on life satisfaction. The direct effects are that, everything else equal, more turnover translates into both, a higher probability of becoming unemployed for the employed which reduces life satisfaction, and a higher probability for the unemployed to find a new job, which increases life satisfaction. The indirect effect is that a higher rate of turnover implies a higher growth externality and therefore a higher net present value of future earnings: this enhances life satisfaction. Overall, a first prediction of the model is that a higher turnover rate increases wellbeing more when controlling for aggregate unemployment, than when not controlling for aggregate unemployment. A second prediction is that higher turnover increases wellbeing more, the more turnover is associated with growth-enhancing activities. A third prediction is that higher turnover increases wellbeing more for more forward-looking individuals. A fourth prediction is that higher turnover increases wellbeing more, the more generous are unemployment benefits.[4]

In the second part of the paper we test the predictions of the model using cross-section MSA-level US data. To measure creative destruction we follow Davis, Haltiwanger and Schuh (1996) and use their measure of job turnover, defined as the job creation rate plus the job destruction rate.[5] The data come from the Census' Business Dynamics Statistics (BDS) and are at the MSA level. For robustness checks, we also use the Longitudinal Employer-Household Dynamics (LEHD) data from the Census, which provides information on hires, separations, employment, and thus turnover, also at the MSA-level. To measure subjective wellbeing, we use the life satisfaction index from the Behavioral Risk Factor Surveillance System (BRFSS), and the Cantril ladder of life from the Gallup Healthways Wellbeing Index (Gallup), which asks about both current and anticipated well-being. The BRFSS measure is constructed using the question "In general how satisfied are you with your life?"; the Cantril ladder is based on the following questions: "Imagine a ladder with steps numbered from 0 at the bottom to 10 at the top; the top of the ladder represents the best possible life for you and the bottom of the ladder represents the worst possible life for you. On which step of the ladder would you say you personally feel you stand at this time? And which level of the ladder do you anticipate to achieve in five years?" Another measure of wellbeing we also

[4] In the Appendix we characterize the transitional dynamics of the model, and also extend the analysis to the case where job destruction can be partly exogenous, or to the case where the turnover rate is endogenously determined by a free entry condition.

[5] We have also looked at firm turnover, namely the sum of the establishment entry rate and the establishment exit rate, with similar results.

consider using the Gallup database, as it could more directly capture how individuals react to the risk involved in creative destruction, is the "worry" measure based on individual answers to the question: "Did you experience worry during a lot of the day yesterday?".

We investigate whether Schumpeterian creative destruction affects all these measures of well-being positively or negatively, by regressing our measures of subjective wellbeing on our creative destruction variables. Our main finding is that the effect of the turnover rate on wellbeing is unambiguously positive when we control for unemployment. This result is consistent with the theory, and it is remarkably robust. In particular it holds: (i) whether looking at wellbeing at MSA-level or at individual level; (ii) whether looking at the life satisfaction measure from the BRFSS or at the Cantril Ladder measures from the Gallup survey; (iii) whether using the BDS or the LEHD data to construct our proxy for creative destruction. We also find that the positive effect of turnover is stronger on anticipated wellbeing than on current wellbeing. On the other hand, creative destruction increases individuals' worry - which reflects the fact that more creative destruction is associated with higher perceived risk by individuals. Next, when interacting creative destruction with MSA-level industry characteristics; we find that the positive effect of turnover on wellbeing is stronger in MSAs with above median productivity growth or with below median outsourcing trends. Finally, we find that higher turnover increases wellbeing more in states with unemployment insurance policies that are more generous than the median.

The paper relates to two main strands of literature. First, to the literature on subjective wellbeing. There, as mentioned above, we contribute by looking at the channels whereby innovation-led growth affects wellbeing. Second, to the literature on growth, job turnover and unemployment.[6] In particular this literature points to two opposite effects of growth on unemployment. One is a "capitalization" effect whereby more growth reduces the rate at which firms discount the future returns from creating a new vacancy: this effect pushes towards creating more vacancies and thus towards reducing the equilibrium unemployment. The counteracting effect is a "creative destruction" effect whereby more growth implies a higher rate of job destruction which in turn tends to increase the equilibrium level of unemployment. We contribute to this literature by looking at the counteracting effects of innovation-led growth on subjective wellbeing.

The remaining part of the paper is organized as follows. Section 2 develops the model and generates predictions on the effects of turnover on subjective wellbeing, and how these effects depend upon individual or local labor market characteristics. Section 3 describes the data, the approach underlying the empirical analysis, and presents the empirical results. Section 4 concludes. The Appendix contains extensions to the baseline framework and all regression tables. Additional proofs and derivations are included in the Online Appendix.

[6] E.g see Davis, Haltiwanger, and Schuh (1996), Mortensen and Pissarides (1998), and Aghion and Howitt (1998).

2 Theoretical analysis

2.1 A toy model

In this section, we will offer a simple model to motivate our empirical analysis. The source of economic growth is Schumpeterian creative destruction which at the same time generates endogenous obsolescence of firms and jobs. The workers in the obsolete firms join the unemployment pool until they are matched to a new firm. Higher firm turnover has both a positive effect (by increasing economic growth and by increasing employment prospects of unemployed workers) and a negative effect (by increasing the probability of currently employed workers losing their job) on wellbeing. Which effect dominates will in turn depend upon both individual characteristics (discount rate, risk-aversion,...) and characteristics of the labor market (unemployment benefits,...). To keep the analysis tractable, in what follows we will consider a steady-state economy with exogenous entry, risk neutral agents, and only endogenous job destruction. These assumptions will be relaxed in the Appendix: Section A focuses on transitional dynamics, B considers a model with exogenous job destruction, C considers the implications of risk aversion, and D endogeneizes entry in the theoretical model.

2.1.1 Production technology and innovation

We consider a multi-sector Schumpeterian growth model in continuous time. The economy is populated by infinitely-lived and risk-neutral individuals of measure one, and they discount the future at rate ρ.[7] Therefore the household Euler equation is simply

$$r = \rho, \tag{1}$$

where r is the interest rate of the economy.

The final good is produced using a continuum of intermediate inputs, according to the logarithmic production function:

$$\ln Y_t = \int_{j \in \mathcal{J}} \ln y_{jt} dj$$

where $\mathcal{J} \subset [0,1]$ is the set of active product lines. We will denote its measure by $J \in [0,1]$. The measure J is invariant in steady state.

Each intermediate firm produces using one unit of labor according to the following linear production function,

$$y_{jt} = A_{jt} l_{jt},$$

[7] The analysis in this section can be straightforwardly extended to the case where individuals are risk-averse. See the Appendix C.

where $l_{jt} = 1$ is the labor employed by the firm, and is the same in all sectors. Thus the measure of inactive product lines is equal to the unemployment rate

$$u_t = 1 - J_t,$$

where u denotes the equilibrium unemployment rate. Our focus will be on balanced growth path equilibrium, therefore when possible, we will drop time subscripts to save notation.[8]

2.1.2 Innovation and growth

An innovator in sector j at date t will move productivity in sector j from A_{jt-1} to

$$A_{jt} = \lambda A_{jt-1},$$

where $\lambda > 1$. The innovator is a new entrant, and entry occurs in each sector with Poisson arrival rate x which we assume to be exogenous.[9] Upon entry in any sector, the previous incumbent firm becomes obsolete and its worker loses her job and the entering firm posts a new vacancy with an instantaneous cost cY.[10] Production in that sector resumes with the new technology when the firm has found a new suitable worker. In Appendix B, we extend the model so as to also allow for exogenous job destruction.

2.1.3 Labor market and job matching

Following Pissarides (1990), we let

$$m(u_t, v_t) = u_t^{\alpha} v_t^{1-\alpha} \tag{2}$$

denote the arrival rate of new matches between firms and workers, where u_t denotes the number of unemployed at time t and v_t denotes the number of vacancies. Thus the flow probability for each unemployed worker to find a suitable firm is

$$m(u_t, v_t)/u_t,$$

whereas the probability for any new entrant firm to find a suitable new worker is

$$m(u_t, v_t)/v_t.$$

In steady state, there will a constant fraction of product lines that are *vacant* (of measure v), and the remaining fraction will be *producing*. We illustrate this economy in Figure 1.

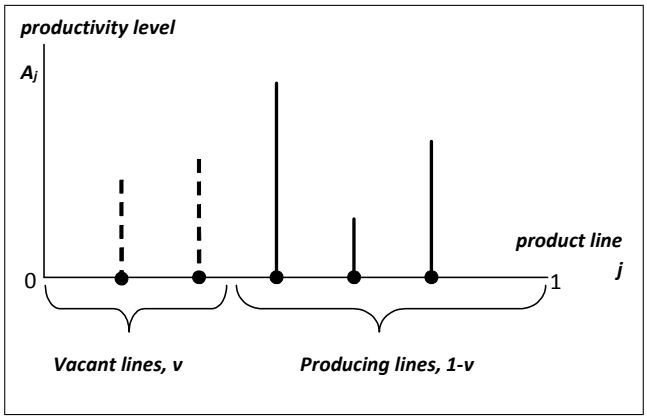
[8] In Appendix A, we consider the transitional dynamics. As it is shown there, convergence to the steady state happens very rapidly, therefore focusing on steady-state of our model is almost without loss of generality.

[9] See Appendix D for an extension of the model where we endogeneize entry.

[10] In the Online Appendix, we provide sufficient conditions under which the incumbent firm in any sector will choose to leave the market as soon as a new entrant shows up in that sector. The basic story is that, conditional upon a new entrant showing up, it becomes profitable for the incumbent firm to seek an alternative use of her assets.

Finally, we assume that in each intermediate sector where a worker is currently employed, the worker appropriates fraction β of profits whereas the complementary fraction $(1-\beta)$ accrues to the employer.

FIGURE 1. MODEL ECONOMY



2.1.4 Valuations and life satisfaction

Our proxy for life satisfaction is the average present value of an individual employee, namely:

$$W_t = u_t U_t + (1-u_t)E_t,$$

where U_t is the net present value of an individual who is currently unemployed, and E_t is the net present value of an individual who is currently employed.[11]

The value of being currently employed, satisfies the asset equation:

$$\rho E_t - \dot{E}_t = w_t + x(U_t - E_t).$$

In words: the annuity value of being currently employed is equal to the capital gain $\dot{E}_t$ plus the wage rate w_t at time t and with arrival rate x the worker becomes unemployed as the incumbent firm is being displaced by a new entrant. Here we already see the negative effect of turnover on currently employed workers.

Similarly the value of being unemployed satisfies the asset equation:

$$\rho U_t - \dot{U}_t = b_t + (m(u_t, v_t)/u_t)(E_t - U_t).$$

As before, the annuity value of being currently unemployed is equal to the capital gain $\dot{U}_t$ plus the benefit b_t accruing to an unemployed worker,[12]and with arrival rate $m(u_t, v_t)/u_t$ the unemployed

[11] Thus our theoretical measure of subjective wellbeing is the ex ante expected valuation of a representative individual who does not know yet whether she will start being employed or unemployed. In the next section, we shall argue that the anticipated Cantril ladder is a good empirical proxy for this ex ante valuation indicator.

[12] Think of this benefit term as being the sum of a (monetary) unemployment benefit and of a private utility (or disutility) of being currently unemployed.

worker escapes unemployment. For any given unemployment rate, turnover has a positive effect on the value of unemployed because it creates job opportunities.

2.2 Solving the model

We now proceed to solve the model for equilibrium production and profits, for the equilibrium steady-state unemployment rate, for the steady-state growth rate, and for the equilibrium value of life satisfaction.

2.2.1 Static production decision and equilibrium profits

Let w_t denote the wage rate at date t. The logarithmic technology for final good production implies that the final good producer spends the same amount Y_t on each variety j. As a result, the final good production function generates a unit elastic demand with respect to each variety: $y_{jt} = Y_t/p_{jt}$.

Note that the cost of production is simply w_{jt} which is the firm-specific wage rate. Then the profit is simply

$$\pi_{jt} = p_{jt}y_{jt} - w_{jt} = Y_t - w_{jt}. \tag{3}$$

Next, the above sharing rule between wage and profits implies that $w_{jt} = \beta\left(Y_t - w_{jt}\right)$, hence

$$w_{jt} = w_t = \frac{\beta}{1+\beta}Y_t, \text{ and } \pi_{jt} = \frac{1}{1+\beta}Y_t = \pi Y.$$

Clearly β determines the allocation of income in the economy, with a higher β shifting the income distribution towards workers.

2.2.2 Steady state equilibrium unemployment

Our focus is on a steady state equilibrium in which all aggregate variables (Y_t, w_t, U_t, E_t) grow at the same constant rate g, and where the measure of unemployed u and the number of vacancies and the interest rate remain constant over time.[13] Henceforth, we can drop the time index from now on.

In steady state, the flow out of unemployment must equal the flow into unemployment. Namely:

$$m(u, v) = (1-u)x. \tag{4}$$

The left-hand side is the flow out of unemployment, the right hand side is the flow into unemployment, equal to the number of active sectors $(1-u)$ time the turnover rate x.

[13] In Appendix A, we analyze the transitional dynamics of this model. More specifically, we look at the dynamic impact of a sudden increase in the entry rate. In particular we show that: (i) following that increase in the entry rate convergence to the steady-state is fast; (ii) the big change in welfare occurs at the time of the increase in entry rate, and: (iii) the comparative statics on this change is quite similar to the comparative statics on steady-state welfare stated in Proposition 1 below.

In addition, the number of sectors without an employed worker is equal to the number of sectors with an open vacancy, $u = v$. Combining this fact with the matching technology (2), we get:

$$m = u = v. \tag{5}$$

Putting these equations (4) and (5) together, we obtain the equilibrium unemployment rate $u = (1 - u)x$, or equivalently

$$u = \frac{x}{1 + x}. \tag{6}$$

That the numerator of u be increasing in x reflects the job destruction effect of turnover on currently employed workers; that the denominator be also increasing in x reflects the positive effect a higher turnover rate has on the job finding rate of currently unemployment workers.

The first effect dominates here, with the equilibrium unemployment rate being increasing in the turnover rate x. However this very much hinges on the fact that innovative turnover is the only source of job destruction in this baseline model. In Appendix B, we introduce the possibility of exogenous job destruction on top of innovation-driven job destruction. Then we show that the higher the exogenous rate of job destruction, the more will the innovation rate x contribute to reducing unemployment, and therefore the more positive the overall effect of x on equilibrium wellbeing.

Now we can express the growth rate of the economy.

Lemma 1 *The balanced growth path growth rate of the economy is equal to*

$$g = m \ln \lambda,$$

where m denotes the flow of sectors in which a new innovation is being implemented (i.e., the rate at which new firm-worker matches occur).

Proof. See the Online Appendix. ■

Then, using the fact that in steady-state equilibrium we have:

$$m = u = \frac{x}{1 + x},$$

we get the equilibrium growth rate as,

$$g = \frac{x}{1 + x} \ln \lambda. \tag{7}$$

As expected, the growth rate is increasing in the turnover rate x and with the innovation step size λ.

2.2.3 Equilibrium valuations and life satisfaction

Recall that our proxy for life satisfaction is the average present value of an individual employee, namely:

$$W = uU + (1-u)E,$$

where:

$$rE - \dot{E} = \beta\pi Y + x(U-E), \text{ and} \tag{8}$$

$$rU - \dot{U} = bY + (m(u,v)/u)(E-U). \tag{9}$$

Now, after substituting for E and U in the expression for W, and using the fact that in steady state $\dot{E} = gE$ and $\dot{U} = gU$, and that in equilibrium (see equation (5)) $m = u = x/(1+x)$, we get the following expression for life satisfaction:[14]

$$W = \frac{Y}{r-g}\left[\beta\pi - \frac{xB}{1+x}\right] \tag{10}$$

where

$$g = \frac{x}{1+x}\ln\lambda \text{ and } B \equiv \beta\pi - b.$$

From the above expression for W, we see three effects of turnover on life satisfaction. First, for given growth rate g, more turnover increases the probability of an employed worker losing her current job (numerator in $\frac{xB}{1+x}$) which reduces life satisfaction; second, for given growth rate g, more turnover increases the probability of an unemployed worker finding a new job (denominator in $\frac{xB}{1+x}$) which increases life satisfaction; third, higher turnover increases the growth rate g which in turns acts favorably on life satisfaction: this is the *capitalization* effect mentioned in the introduction. The overall effect of turnover on life satisfaction is ambiguous.[15]

Finally, if we look at the effect of turnover on life satisfaction controlling for unemployment, this effect is unambiguously positive. To see this, after some straightforward algebra we reexpress equilibrium welfare W as:

$$W = \frac{Y}{r-g}[ub + (1-u)\beta\pi] \tag{11}$$

which for given u is increasing in x since it is increasing in g and g is increasing in x (capitalization effect).[16]

[14] See the Online Appendix for the detailed derivation of (10).

[15] Using the fact that: $\frac{\partial W}{\partial x} = \frac{Y[\beta\pi\ln\lambda - B\rho]}{[(1+x)(\rho-\ln\lambda)+\ln\lambda]^2}$, we see that $\frac{\partial W}{\partial x} > 0$ if and only if $\rho < \frac{\beta\pi\ln\lambda}{B}$.

[16] See the Online Appendix for the detailed derivation of equation 11.

2.2.4 Comparative statics

Using the fact that:

$$\frac{\partial W}{\partial x} = \frac{Y\left[\beta\pi \ln\lambda - B\rho\right]}{\left[(1+x)\left(\rho - \ln\lambda\right) + \ln\lambda\right]^2},$$

we immediately get that a higher turnover rate x increases life satisfaction W more the lower the discount rate ρ:[17]

$$\frac{\partial^2 W}{\partial x \partial \rho} < 0.$$

Next, life satisfaction increases more with turnover x the more generous unemployment benefits[18]:

$$\frac{\partial^2 W}{\partial x \partial b} > 0.$$

A final remark is in order. In our analysis, life satisfaction is not necessarily equal to the present discounted value of income for at least two reasons. First, even though we labelled b as unemployment benefit, the interpretation of it is much more general and it can embody in reality the private disutility associated with being unemployed or opportunity cost of not working. Second, our results also hold for the case of risk aversion as we illustrate in Appendix C in which case income and life satisfaction are distinct objects.

2.2.5 Summary and main predictions

We summarize the above discussion in the following proposition:

Proposition 1 *(i) A higher turnover rate x increases life satisfaction W unambiguously once we control for the unemployment rate, not otherwise; (ii) a higher turnover rate increases life satisfaction more the lower the discount rate ρ; (iii) life satisfaction increases more with turnover x the more generous are unemployment benefits.*

In the empirical analysis below, we will use cross-MSA data on wellbeing and job turnover to test the following predictions from the model:

Prediction 1: A higher turnover rate increases wellbeing more when controlling for aggregate unemployment than when not controlling for aggregate unemployment.

Prediction 2: A higher turnover rate increases wellbeing more, the more turnover is associated with growth-enhancing activities (i.e, the less it stems from unilateral job destruction).

[17] And in fact life satisfaction increases with turnover when $\rho < \frac{\beta\pi\ln\lambda}{B}$, and it decreases with turnover otherwise.

[18] Indeed:

$$\frac{\partial^2 W}{\partial x \partial b} = \frac{Y\rho}{\left[(1+x)\left(\rho - \ln\lambda\right) + \ln\lambda\right]^2} > 0.$$

Prediction 3: A higher turnover rate increases wellbeing more for more forward-looking individuals.

Prediction 4: A higher turnover rate increases wellbeing more, the more generous unemployment benefits.

3 Empirical analysis

3.1 Data

The data on creative destruction come from the Business Dynamics Statistics, which provide, at the metropolitan level (MSA), information on job creation and destruction rates as well as on the entry and exit rates of establishments.[19] These rates are computed from the whole universe of firms as described in the Census Longitudinal Business Database. Our main measure of creative destruction is the "job turnover rate", defined as the sum of the job creation and job destruction rates. We also analyze the role of creation rates and destruction rates separately. We look at alternative measures of creative destruction in our robustness checks.

The data on subjective wellbeing come from two sources. First, the Gallup Healthways Wellbeing Index, which collects data on 1,000 randomly selected Americans each day through phone interviews. The period covered is 2008-2011. Subjective wellbeing in Gallup is assessed through various questions aimed at capturing different dimensions of wellbeing. Some questions target the individual's current *emotional* state[20] and are framed along those lines: "Did you experience worry/sadness/happiness during a lot of the day yesterday?". Answers are binary, 0 or 1. We use the "worry" variable, which is the variable most likely to capture the effect of the (unemployment) risk associated with creative destruction. Alternatively, the "Cantril ladder of life" questions are destined to measure the individual's *evaluation* of her life. Each individual is asked: "Please imagine a ladder with steps numbered from 0 at the bottom to 10 at the top; the top of the ladder represents the best possible life for you and the bottom of the ladder represents the worst possible life for you; on which step of the ladder would you say you personally feel you stand at this time?"; and then "which level of the ladder do you anticipate to achieve in five years?". We refer to answers to the first question as the "current ladder" and to the second one as the "anticipated ladder". The "anticipated ladder" measure is particularly interesting as we recall that the theoretical wellbeing indicator W analyzed in the previous section is precisely an expectation, namely the ex ante expected valuation of an individual who does not know yet whether she will start being employed or unemployed.

[19] The job creation (destruction) rate is the sum of all employment gains (losses) from expanding establishments from year $t-1$ to year t including establishment startups, divided by the average employment between years t and $t-1$.

[20] See Deaton and Kahneman (2010) for the distinction between emotional and evaluative wellbeing.

The second source of data on subjective wellbeing is the Behavioral Risk Factor and Surveillance System (BRFSS). The sample size is also roughly 350,000 respondents per year, and the period covered is 2005-2010. To proxy for subjective well-being in the BRFSS, we use the Life Satisfaction question: "In general how satisfied are you with your life?". The possible answers are: "Very satisfied"; "Satisfied"; "Dissatisfied"; "Very dissatisfied". We recode these answers so that "Very dissatisfied" corresponds to grade 1 and "Very satisfied" corresponds to grade 4. The descriptive statistics of our data can be found in Table 1.

TABLE 1 *HERE*

3.2 Estimation framework

The model highlights two opposite forces whereby creative destruction impacts subjective wellbeing: the negative effect that comes from the higher risk of unemployment and the positive effect through higher growth expectations. A testable prediction of the model is that when regressing subjective wellbeing measures on creative destruction variables, controlling for the unemployment rate should capture part of the negative force of creative destruction and thus lead to a more positive coefficient of creative destruction on wellbeing than without the control for unemployment.

Our measure of creative destruction varies at the MSA level, thus we estimate MSA-level regressions. However, in order to take advantage of our micro-level data on subjective wellbeing, we also perform individual-level regressions that allow us to have a richer and more meaningful set of controls.[21]

In both cases, regressions are OLS and the first exercise we perform is to compare the coefficients from a baseline specification with and without the control for the MSA-level unemployment rate. We restrict the analysis to working age individuals (18-60 years old) to be closer to the model in which individuals are either employed or unemployed.[22]

At the MSA level, we look at purely cross-sectional regressions where we average our subjective wellbeing data at the MSA-level and across the different years available: 2005-2010 for the BRFSS data, and 2008-2011 for the Gallup data. Table 2 focuses on life satisfaction, as measured either by the BRFSS, or by the current and anticipated ladder of the Gallup-Healthways Wellbeing Index. Table 3 investigates the effect on an alternative dimension of wellbeing: individuals' "worry". In all cases, we also look at how the effect of creative destruction is decomposed into a "job creation" effect and a "job destruction" effect.

In Table 4, we allow the unemployment rate to have a non-linear effect on subjective wellbeing

[21] Individual characteristics like marital status do not vary much if we aggregate them at the MSA level, yet they are very important determinants of wellbeing at the individual level.

[22] However, we performed all the regressions for the whole population as well, which yields very similar results.

by introducing a cubic polynomial of the unemployment rate in the regressions. In Tables 5 and 6, we control for income per capita. Our preferred way of doing so is by using MSA-level averages of the log of BRFSS or Gallup respondents' income. We also check and report results when using the log of MSA-level income per capita as measured by the Bureau of Economic Analysis and averaged over the relevant period (2005-2010 for the BRFSS regressions and 2008-2011 for the Gallup ones). Tables 7 and 8 explore what happens when we add MSA-level potential confounders such as crime rate, the share of African Americans and population (in levels).

We then perform individual level regressions, where we control for individual characteristics such as education and ethnicity, as well as gender, marital status, and age. Income is not an innocuous control as the effect of creative destruction is likely to operate precisely through income, so we show results separately with and without this control.

The specification is as follows:

$$SWB_{i,m,t} = \alpha CD_{m,t} + \beta U_{m,t} + \delta X_{i,t} + T_t + \epsilon_{i,t}, \tag{12}$$

where $SWB_{m,t}$ is subjective wellbeing for individual i who lives in MSA m in year t. This measure is derived either through the life satisfaction question of the BRFSS or through the current ladder question or the anticipated ladder question in the Gallup survey. $CD_{m,t}$ is creative destruction in MSA m in year t, which we take to be either the sum of the job creation rate and the job destruction rate, or these two components introduced separately but simultaneously in the regression. $U_{m,t}$ is the unemployment rate in that MSA in year t. $X_{i,t}$ are individual-level controls: gender, age, age square, race, detailed education, detailed family status and, in some specifications, dummies for income brackets.[23] T_t are year and month fixed effects. And $\epsilon_{m,t}$ is the error term. A constant is also included and standard errors are clustered at the MSA level. The main coefficient of interest is α. We look at how this coefficient changes depending on whether or not we control for unemployment. We perform several robustness checks which we discuss below. We then look at how the effect of creative destruction differs according to the sectoral composition of the MSA: some sectors have stronger or weaker employment prospects, depending on their growth rate or on their tendency to outsource.

3.3 Baseline results

3.3.1 MSA-level results

Table 2 shows the results from the baseline OLS regressions at the MSA level. Panel A of Table 2 is based on the BRFSS dataset and thus the dependent variable is the Life Satisfaction index

[23] In both surveys, income is measured by income brackets: monthly individual income in Gallup and annual household income in Gallup. We use dummies for these brackets.

constructed from answers to the question "How satisfied are you with your life?". Column (1) shows a negative effect of unemployment on Life Satisfaction. Column (2) shows a non-significant positive effect of job turnover on Life Satisfaction. Column (3) shows that once we control for unemployment, job turnover has a positive significant effect on Life Satisfaction. This is in line with our model which predicts that, controlling for unemployment, turnover should only have a positive effect on wellbeing as it implies higher growth and a higher probability for currently unemployed workers of finding a new job.[24] Column (4) decomposes job turnover between job creation and job destruction. We see the positive effect of job creation and the negative effect of job destruction, although the latter becomes non-significant once we control for unemployment (Column (5)).

Panel B of Table 2 reproduces the same exercise but using the Gallup survey and the corresponding Cantril ladder indicator. Remarkably, even though the data set and measure are completely different from those in the BRFSS, the results exactly mirror those from the BRFSS, namely: (i) a negative effect of unemployment on the Cantril ladder in Column (1); (ii) a positive but barely significant effect of job turnover on the ladder in Column (2); (iii) a significant and more positive effect of turnover on the ladder once we control for unemployment in Column (3); (iv) a positive effect of job creation and a negative effect of job destruction in Column (4), the latter being more than halved once we control for unemployment (Column (5)).

TABLE 2 HERE

Panel C of Table 2 reproduces the same regression analysis but looking at the effect of job turnover on the Anticipated ladder (which again uses the Gallup data). By comparing with Panel B, we first see that job turnover has a stronger effect on the Anticipated ladder than on the current Cantril ladder. Moreover, Column (2) shows that job turnover has a positive and significant effect on the Anticipated ladder even if we do not control for unemployment. This in turn points to the notion that individuals disentangle the short-run losses from becoming unemployed as a result of job turnover from the long-term gains associated with higher growth and more new job opportunities in the future. This view is confirmed by looking at Column (4) which shows that the negative effect of job destruction on the Anticipated ladder is barely significant even if we do not control for unemployment.

Table 3 looks at the effect of job turnover on the "Worry" measure of wellbeing. We see that job turnover increases "worry", and that the coefficient becomes smaller when we control for unemployment. This again is in line with the theory, and suggests that one source of short-run

[24] The correlation between the MSA-level average job turnover rates over the period 2005-2010 and the MSA-level average unemployment rates over the same period, is equal to 0.27.

stress from higher turnover is due to the increased probability of becoming unemployed.

TABLE 3 HERE

Now, consider the magnitudes of the various effects. Consistently across both datasets, the magnitude of the effect of creative destruction on current life satisfaction is in the same ballpark as that of the effect of the unemployment rate. In particular, moving from an MSA which is at the 25th percentile in terms of its level of creative destruction (i.e with a job creation rate + destruction rate at 23.4%) to an MSA at the 75th percentile (i.e with a job creation rate plus job destruction rate at 28.3%) is associated with an increase in the current ladder of life of 0.067 points (Column (3) in Table 2, Panel B). As a benchmark, looking at the same regression, moving from the 75th to the 25th percentile in terms of the unemployment rate (that is, from a 9.4% to a 6.7% unemployment rate) is associated with an increase in life satisfaction of 0.08 points. Another way to put it is that a one standard deviation increase in job turnover has an effect equivalent to a 0.7 standard deviation increase in the MSA level unemployment rate.

When focusing on anticipated wellbeing, that is, on Panel C of Table 2, the effect of creative destruction is slightly stronger than that of the unemployment rate. Indeed, a one standard deviation increase in job turnover has an effect on the future ladder of life equivalent to a 1.3 standard deviation increase in the MSA-level unemployment rate.

Table 4 shows that the significance and sign of the job turnover coefficient remain when introducing the square and the cube of the unemployment rate as additional controls. Thus the positive effect of job turnover is not standing proxy for potential non-linearities in the effect of the unemployment rate.

Tables 5 and 6 add controls for income per capita. Table 5 focuses on the Cantril ladder of life from Gallup whereas Table 6 uses the BRFSS measure of life satisfaction. In these tables, Panel A just reproduces the baseline results showed in Table 2. Then Panel B adds our preferred control for income. In both surveys, income is measured in terms of income brackets. We take the midpoints of these brackets assuming that income is log-normally distributed and we then average at the MSA-level these log midpoints. Panel C controls for income in another way: namely, we take the MSA-level income per capita measure from the Bureau of Economic Analysis, average it over the relevant years and then take its log. We see that, when the Cantril ladder of life is the dependant variable (Table 5), not only do both types of control for income yield very similar results but the coefficient for the job turnover rate remains essentially the same as in the specification without any control for income. This result is in line with our remark in the theory section about the effect of turnover on wellbeing going beyond the effect of turnover on income.[25]

[25] The F-test for the joint significance of the job creation and the job destruction rates when we control for the unemployment rate and average log of income is 13.75.

Now if we move to the BRFSS dataset (Table 6), controlling for the BEA income per capita measure (Panel C) yields a very similar coefficient for the job turnover rate as in the specification without control for income (Panel A). But, when controlling for the average log income as measured by the BRFSS (Panel B) job turnover has a significant effect on life satisfaction even when we do not control for the unemployment rate (column 2). However we still obtain a coefficient for the job turnover rate which is higher when we control for unemployment (column 3) than when we do not (column 2).

Tables 7 and 8 add further controls which are meant to capture characteristics of MSAs that might a priori confound the results which we care about. Thus to the baseline specifications of Tables 2 and 3 we add controls for the average log of income (as measured by the BRFSS or Gallup surveys), MSAs' population levels coming from the BEA, crime rates from the FBI Crime Statistics and the share of African Americans in the MSA.[26]Comparing Table 7 to Table 2 and Table 8 to Table 3 provide evidence that, for all subjective wellbeing measures considered, our baseline results are robust to adding these potential confounders as controls.

Overall, creative destruction has an effect on subjective wellbeing of the opposite sign from that of unemployment but of similar magnitude when measuring wellbeing by current life satisfaction; and the effect of creative destruction on subjective wellbeing is of a higher magnitude than that of unemployment when measuring wellbeing by anticipated life satisfaction (i.e by the Anticipated ladder).

TABLES 4 to 8 *HERE*

3.3.2 Individual level results

In Tables 9 to 12, we perform individual-level regressions using the BRFSS and the Gallup data and find qualitatively similar results as in Tables 2 and 3. The difference is that we now also control for individual-level characteristics and for year and month fixed effects.

TABLES 9 to 12 *HERE*

Panels "A" in all Tables 9 to 12, are without individual demographic controls, whereas Panels "B" in these tables include all controls except income and Panels "C" also control for income. Our preferred specification in all tables is that of Panels "B", as the model predicts that the indirect positive effect of job turnover on individual wellbeing goes through a higher net present value of earnings, and controlling for self-reported income might partially shut down this latter channel.

[26]The share of African Americans is a weighted average of the number of respondents in the surveys that report being black in the race question. Weights use to compute the weighted average are those attached to the respondent by either Gallup or the BRFSS.

The magnitude of the creative destruction effect is roughly similar to that displayed at the MSA level, although slightly smaller. A one standard deviation increase in job turnover has an effect on the current ladder of life which is equivalent to half a standard deviation increase in the MSA-level unemployment rate. And it has an effect on the future ladder of life twice as large as that on the current ladder.

3.4 Robustness analysis

3.4.1 Subperiod analysis

To deal with the concern that the period post 2008 is a period following a major recession, where all sorts of other things were going on in developed economies, in Table 13 we decompose the overall BRFSS sample period into the subperiods 2005-2007 and 2008-2010. The Table shows that the main result, namely that the effect of the turnover rate on wellbeing is unambiguously positive when we control for unemployment and less so if we do not, remains true in both subperiods.

TABLE 13 *HERE*

3.4.2 Alternative database for creative destruction

As an alternative to the creative destruction data from the Census' Business Dynamics Statistics (BDS), here we use the Longitudinal Employer-Household Dynamics (LEHD) dataset constructed by the Census bureau. These data are constructed based on the Quarterly Census of Employment and Wages (QCEW) and other administrative and survey data. They contain information on employment, earnings, and job flows at the MSA level with a detailed industry breakdown. The only state that does not participate in this program is Massachusetts (and Puerto Rico). We will take advantage in the next subsections of the detailed breakdown at the industry level. In terms of creative destruction: rather than job creations and destructions, the data give us the number of hires and separations. They give both the raw numbers of all hires and separations that occur during a given quarter in a given MSA, and the numbers of so-called "stable hires", that is hires that lasted at least a full quarter, and so-called "separations from stable jobs", that is a separation from a job that had begun in the previous quarter. To compute the turnover rates, we divide these hires or separations by the average stock of employment between the previous quarter and the current one (or the average stock of stable jobs for the "stable job turnover" measure). The correlation between our proxy for creative destruction in the two different datasets is around 0.6. Table 14 shows the robustness of the MSA-level baseline results to using this alternative measure of creative destruction (with slightly more positive coefficients for stable job turnover).

TABLE 14 *HERE*

3.4.3 Panel analysis and predicted creative destruction

Using the quarterly data from the Longitudinal Employer-Household Dynamics (LEHD) dataset, we can perform two additional exercises. The first exercise is to look at the relationship between turnover and wellbeing in panel regressions with year, quarter and MSA fixed effects (Table 15, columns 1, 2 and 3). Whether looking at Panels A or B, i.e. whether considering the turnover rate for stable jobs or for all jobs, if we compare column 1 to column 2, we see again that the coefficient for job turnover is higher when we control for the MSA-level unemployment rate than when we do not. These two columns are without MSA fixed-effects. When we add MSA fixed effects (column 3), the coefficient of job turnover is still significantly positive although of a smaller magnitude and again this is the case in both Panels A and B.

Second, to abstract from the effects of local changes in industry composition, or from the effects of purely local shocks that could get mixed up with variations in local turnover, we can construct a "predicted measure" (or Bartik-type measure) of creative destruction as follows:

$$\widehat{CD}_{m,t} = \sum_{j} \omega_{j,m,2004} \times CD_{j,USA,t}$$

For each MSA m in quarter-year t, the predicted level of Creative Destruction, $\widehat{CD}_{m,t}$, is computed by taking a weighted average of countrywide turnover measures in sector j, quarter-year t, $CD_{j,USA,t}$, with weights being determined by the sectoral structure in the MSA in 2004, $\omega_{j,m,2004}$ (sectors are 2 digit NAICS).

Thus, in Columns 4, 5, and 6 of Table 15 we reproduce the MSA-level regressions of Columns 1-3, but replacing the direct local turnover variable by its predicted value $\widehat{CD}_{m,t}$. Standard errors are still clustered at the MSA level.[27] The results turn out to be quite similar when using the predicted measure of turnover instead of the actual quarterly turnover rate as right-hand side variable. In particular, the coefficient for job turnover is larger when we control for unemployment than when we do not (columns 5 versus 4) and the coefficient remains positive and significant when we add MSA fixed-effects (column 6). Interestingly the MSA fixed-effects do not make the coefficient decrease as much as when using the actual turnover rate as the main right-hand side variable.

TABLE 15 HERE

3.5 Interactions

We first interact turnover with MSA-level characteristics, and more precisely with the industry composition of the MSAs. Namely, we look at whether the effect of job turnover on wellbeing differs

[27] If we assume that the sectoral composition in an MSA in 2004 has no direct effect on subjective wellbeing in that same MSA in 2005-2011, we could use our predicted measure of creative destruction as an instrument to try and get at whether the effect of creative destruction on subjective well-being is causal.

according to whether the dominant sectors of the MSA have lower or stronger growth potential and have a higher or lower propensity to outsource their activities abroad.

In Table 16 we interact job turnover (or the job creation and job destruction rates separately) with a dummy for being in an MSA above median in terms of the productivity growth in the MSA's industries. The productivity growth measure is constructed as the Bartik variable in the above subsection: namely, as a weighted average of TFP growth in the different sectors,

$$PG_m = \sum_j w_{j,m} TFPG_{j,USA}$$

with weights $w_{j,m}$ corresponding to average sector shares in the MSA's total employment over the period 2005-2010. The source for the productivity measure is the NBER-CES Manufacturing Industry database.[28] This database stops in 2009, thus sectoral nationwide productivity growth is averaged over the period 2005-2009. Table 16 shows that turnover has a more positive effect on well-being in MSAs where industries are growing faster than the median. Indeed we see that, when we do not control for unemployment, the job turnover rate has a positive effect on life satisfaction only in MSAs above median in terms of productivity growth (column 1). When we do control for unemployment, the effect is significantly positive everywhere but significantly stronger in "above median" MSAs.

TABLE 16 *HERE*

In Table 17 we perform the same exercise except that we look at the extent to which industries outsource: presumably, the effect of turnover on wellbeing should be less positive in MSAs where the economic activity is more dominated by industries which outsource more, the idea being that job destruction is more likely to be irreversible in such MSAs. To proxy the extent to which a sector is prone to outsourcing, we follow Autor et al (2013) and use the growth of imports from China in that sector over the period 1991-2007. Sectoral variation is within the 3 digits NAICS manufacturing. Table 12 confirms that turnover has a less positive effect on wellbeing in MSAs where industries are more prone to outsource their activities. Indeed we see that the interaction term between the job turnover rate and the dummy for being above median in terms of the outsourcing threat, is significantly negative whether or not we control for unemployment (columns 1 and 2). Moreover, this is driven by a more negative effect of the job destruction rate in MSAs that are more likely to outsource: namely, the interaction term between the job creation rate and the dummy for being above median is not significant whereas the interaction term between the job destruction rate and the dummy for being above median is significantly negative (columns 3 and 4)

TABLE 17 *HERE*

[28] We thus restrict attention to manufacturing and consider 3 digits NAICS manufacturing sectors.

Finally, we interact turnover with the generosity of unemployment insurance (UI generosity) at the state level. More specifically, in Table 18 we reproduce the baseline MSA-level analysis (Table 2 Panel B) but interacting all creative destruction variables (either the job turnover rate or the job creation rate and job destruction rates separately) with a dummy for whether the MSA in located in a state above median in terms of UI generosity, and controlling for the direct effect of being located in such a state. A state's UI generosity is measured by the average maximum weekly benefit amount over the period 2008-2011. We see that the effect of turnover is only positive for MSAs located in states above median. Moreover this difference come from the effect of the job destruction rate: there are no statistically significant differences for the effect of the job creation rate between MSAs in states above or below median in terms of UI generosity but the effect of the job destruction rate is negative for MSAs in states below median and positive for MSAs in states above median when we control for the unemployment rate.

TABLE 18 *HERE*

In Table 19 we also replicate the baseline MSA level analysis (Table 2 Panel B) but splitting the sample of MSAs into those located in states above median in terms of UI generosity and those located in states below median, and running separate regressions for the two sub-samples. We see that the effect of job turnover on life satisfaction is significantly positive only for MSAs in states above median.

TABLE 19 *HERE*

4 Conclusion

In this paper we have analyzed the relationship between turnover-driven growth and subjective wellbeing, using cross-sectional MSA level US data. We have first built a Schumpeterian model of growth and unemployment to make predictions on how job and firm turnover affect wellbeing under various circumstances. Our main empirical findings are consistent with the theory: namely: (i) the effect of creative destruction on wellbeing is unambiguously positive if we control for MSA-level unemployment, less so if we do not; (ii) creative destruction has a larger positive effect on future wellbeing than on current wellbeing; (iii) creative destruction has a more positive effect on wellbeing in MSAs with faster growing industries or with industries that are less prone to outsourcing; (iv) creative destruction has a more positive effect on wellbeing in MSAs within states with more generous unemployment insurance policies.

The analysis in this paper can be extended in several directions. A first avenue would be to use a similar combination of the theory and of cross-section analysis to investigate other potential determinants of wellbeing and compare them with the determinants of (per capita) GDP growth.

A second extension would be to look at how the relationship between turnover and wellbeing is affected by individual characteristics[29]and by characteristics of labor markets and labor market policy beyond the generosity of unemployment insurance (e.g. training systems, availability of vocational education,..). A third extension would be to look for policy shocks (labor market reforms,...) that may affect the relationship between creative destruction and wellbeing. These and other extensions of the analysis in this paper are left for future research.

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[29] Thus we looked at how the effect of turnover on wellbeing might vary with age: more specifically, we replicated the baseline analysis of Table 2 Panel B but instead of considering the wellbeing of all working age respondents (as in Table 2 Panel B) we looked separately at the wellbeing of respondents below median in terms of age (see Table 20 Panel A) and above median (see Table 20 Panel B), the median age being 40. We found that the effect of turnover on life satisfaction is more positive for the younger individuals, which is in turn consistent with our theoretical prediction that the effect of turnover on wellbeing should be more positive the lower the discount rate.

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Appendix: Extensions

A Transitional dynamics

Now we focus on a sudden change in the entry rate to analyze its impact on the economy's transition from one steady state to the next.

Assume that the economy starts at its steady state with entry rate x_{low} and the entry rate suddenly increases from x_{low} to x_{hgh} such that $x_{hgh} > x_{low}$. We start by focusing on the unemployment rate first. After the change in the entry rate, the flow equation of the unemployment rate becomes

$$\dot{u}_t = (1 - u_t)\, x_{hgh} - m_t.$$

Since $u_t = v_t$ in every period, we get $m_t = u_t = v_t$; therefore

$$\dot{u}_t = x_{hgh} - (1 + x_{hgh})\, u_t. \tag{13}$$

The solution to this differential equation is simply

$$u_t = \left[\frac{x_{low}}{1 + x_{low}} - \frac{x_{hgh}}{1 + x_{hgh}}\right] e^{-(1+x_{hgh})t} + \frac{x_{hgh}}{1 + x_{hgh}}.$$

Recall that the growth rate is simply $g = m \ln \lambda$. Therefore the aggregate growth rate of this economy during transition is

$$g_t = \left\{\left[\frac{x_{low}}{1 + x_{low}} - \frac{x_{hgh}}{1 + x_{hgh}}\right] e^{-(1+x_{hgh})t} + \frac{x_{hgh}}{1 + x_{hgh}}\right\} \ln \lambda.$$

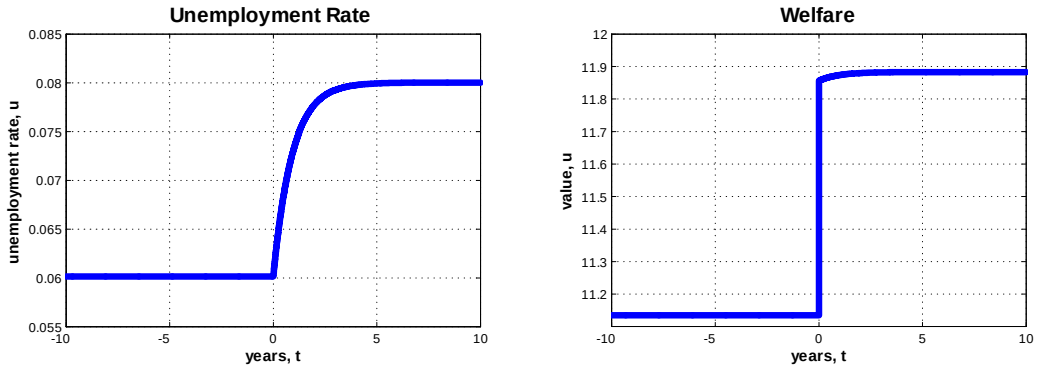
Now we turn to the value functions

$$rE_t - \dot{E}_t = \beta \pi Y_t + x_{hgh}(U_t - E_t), \text{ and } rU_t - \dot{U}_t = bY_t + (m_t(u_t, v_t)/u_t)(E_t - U_t).$$

Note that out of the steady state, it is not possible to solve these value functions further analytically. However, we can explore them numerically. For that, we need to determine 6 parameters: λ, x_{hgh}, x_{low}, ρ, β, and b. Since our model is stylized, our goal here is to show you the numerical properties of the model, rather than trying to provide a detailed calibration exercise. We pick the discount rate, which also corresponds to the interest rate in the benchmark model, to be $\rho = 5\%$. We will set $x_{low} = 6.4\%$ and $x_{hgh} = 8.7\%$ such that the steady-state unemployment rates are 6% and 8%, respectively. We set $\lambda = 1.18$ in order to obtain an initial steady state growth rate of 1%. The worker share of output is chosen to be $\beta = 0.9$ such that the profit share of the firm is 10%. Finally we set the unemployment benefit to be $b = 0.3\%$.

The following figures illustrate this experiment. Until time 0, the economy is at its initial steady state and at $t = 0$, the rate of creative destruction increases from x_{low} to x_{hgh}. The left figure shows

the evolution of the unemployment rate and the right figure shows the effect on equilibrium welfare. For expositional purposes, we plot the welfare after normalizing it by the aggregate output every period.

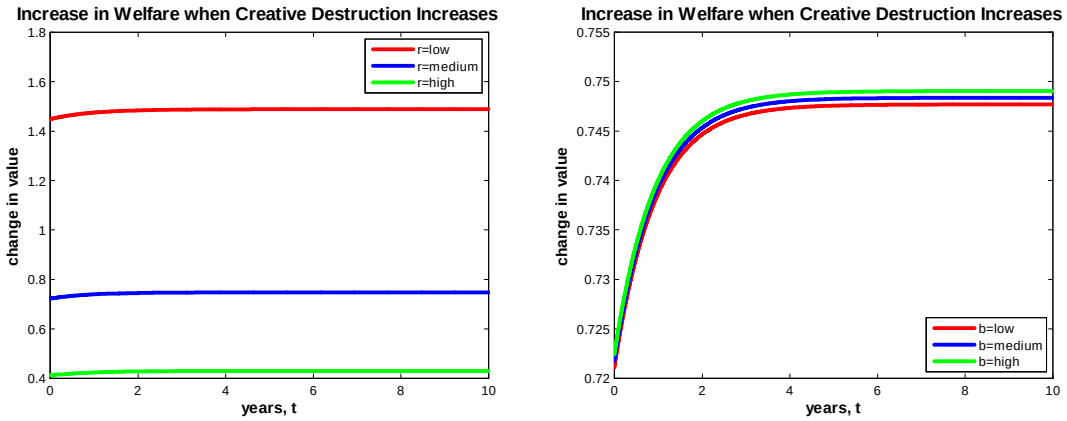


(A) (B)

FIGURE 2.

After the change, the unemployment rate starts to evolve towards its new level according to the law of motion in (13) . What we see is that the convergence is quick and the economy assumes its new steady state value almost after 6 years. The impact on welfare is slightly different. After the sudden change, the welfare function features a sudden jump at time 0 and then starts to evolve towards the new steady state. The big change in welfare occurs at the time of the change in creative destruction and the remaining portion of the transition has much lower impact on the new level of welfare.

The following figures illustrate the change in welfare, i.e. $\Delta W_t = W_{t>0} - W_{t=0}$ for different values of the discount rate ρ and unemployment benefit b.



(A) (B)

FIGURE 3.

These results confirm the steady state results in Proposition 1. The left figure shows that the increase in welfare after the increase in entry is higher, the higher is the unemployment benefit.

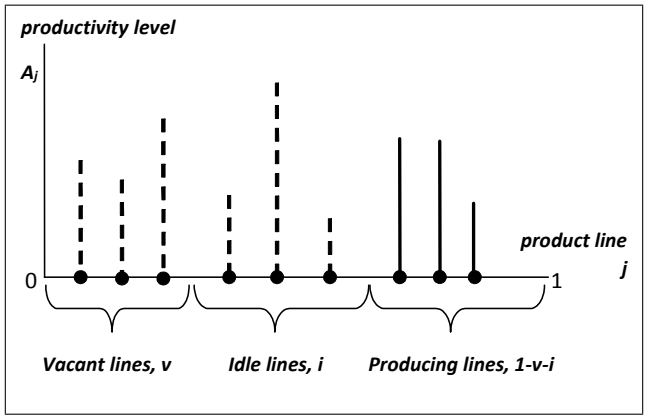
Similarly, the increase in welfare is higher, the lower is the discount rate. Hence, the steady state results of the benchmark model are confirmed in this simple numerical exercise even when the transitions are taken into account.

B Exogenous job destruction

So far, the only source of job destruction, as well as job creation, was new entry. However, in reality, new entry is not the only source of job destruction. Following Pissarides (1990) we now allow for an additional -exogenous- source of job destruction rate. To capture this, we assume that each job is destroyed at the rate ϕ. Upon this destruction shock, the worker joins the unemployment pool and the product line becomes *idle*. When a new entrant comes into this product line at the rate x, it first posts a vacancy in which case then the same product line moves from being *idle* to being *vacant*. Finally, when a vacant product line finds a suitable worker, the product line becomes *producing*. Similarly, if a new entrant enters into a currently producing line, then the sector becomes directly *vacant,* the incumbent worker joins the unemployment pool, and the new entrant searches for a new suitable worker.

In steady state, there will a constant fraction of product lines that are *vacant* (of measure v), a constant fraction of lines that are *idle* (of measure i) and the remaining fraction will be *producing*. We illustrate this economy in the following figure:

FIGURE 4. ECONOMY WITH EXOGENOUS JOB DESTRUCTION



Next, one can compute the steady state fraction of idle, vacant, and producing lines using the following flow equations:

$$\begin{aligned} (1-v)\,x &= m; \\ (1-v-i)\,\phi &= ix. \end{aligned}$$

The left hand side of the first equation is the flow of sectors *into* the *vacant* stage: it is equal to the flow of productive sectors which become (directly) vacant, namely $(1-v-i)x$, plus the flow

of idle sectors which become vacant, namely ix.The sum of these two terms is equal to $(1-v)x$. The right hand side of the first equation is the flow of sectors *out of* the vacant stage: it is simply equal to the job matching rate m.

Similarly, the left hand side of the second equation is the flow *into* the *idle* stage: it is equal to the flow of producing sectors which become idle, namely $(1-i-v)$ times the flow probability ϕ of an exogenous job destruction shock in such a sector. The right hand side is equal to the flow *out of* the idle stage. It is equal to the number of idle sectors times the flow probability of a new entry in such a sector, which will make it become vacant: namely, ix.

By definition unemployment is equal to all the product lines where there is no production, $u = i + v$. Hence the above flow equations can be reexpressed as

$$(1-v)\,x = m, \text{ and } (1-u)\,\phi = (u-v)\,x. \tag{14}$$

Moreover, the matching technology is such that

$$m = u^{\alpha} v^{1-\alpha} \tag{15}$$

Substituting (15) into (14) we get

$$(1-v)\,x = u^{\alpha} v^{1-\alpha}, \text{ and } (1-u)\,\phi = (u-v)\,x. \tag{16}$$

These last two equations give us a system of 2-equations and 2-unknowns. For analytical tractability, assume $\alpha = 0.5$. Then the equilibrium unemployment rate solves a simple quadratic equation, yielding the solution:

$$u = 1 - \frac{(\Psi+1) - \sqrt{(\Psi+1)^2 - 4\left[\Psi - \Psi^2 x^2\right]}}{2\left[\Psi - \Psi^2 x^2\right]}$$

where $\Psi \equiv 1 + \phi/x$.

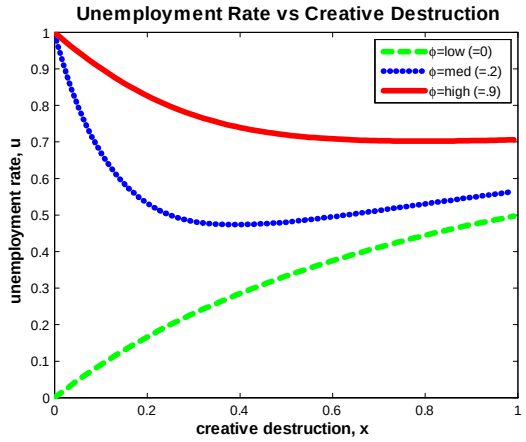


FIGURE 5.

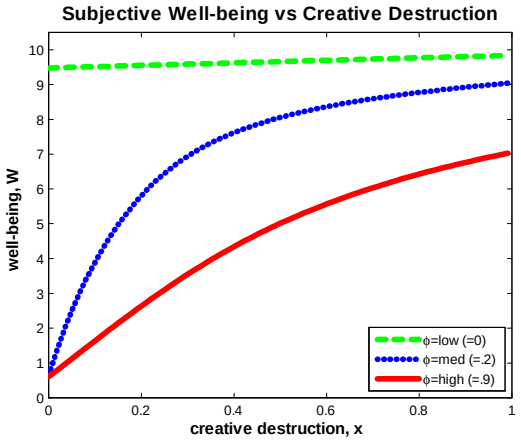


FIGURE 6.

Unlike in the model without exogenous job destruction, the relationship between entry and unemployment, and therefore between growth and unemployment, is no longer automatically monotonic. Here, jobs are being destroyed both by creative destruction at the rate x and also by the exogenous shock ϕ. The only source of job creation is job postings that happens though new entrants. Hence, one would expect that when ϕ is large, then the main role of entry will be job creation whereas when ϕ is very low, then we are back to the previous model and entry will mainly create unemployment. This is evident in Figure 5 that plots the unemployment rate against the entry rate for various values of the exogenous destruction rate $\phi \in \{0, 0.2, 0.9\}$. As expected, as $\phi \to 0$, entry (turnover) and unemployment becomes positively correlated: in this case the *job destruction effect* dominates the job creation effect. On the other hand, when ϕ is very high, then the relationship is negative: in that case the *job creation effect* of innovation-led growth on unemployment dominates the job destruction effect.

Now, moving to the relationship between the innovation-led turnover rate x and well-being W, Figure 6 shows that the higher the exogenous job destruction rate ϕ, the more positive the effect of x on W, especially for small initial values of x : this is not surprising, as the lower x is relative to ϕ, the more the job creation effect of increasing x dominates the job destruction effect.

C Risk aversion

We now consider the case where individuals are risk averse with instantaneous preferences $U = \ln C$, and compute the steady-state value functions under this assumption. Recall that the individuals discount the future at the rate ρ. Then the value functions for currently employed and unemployed individuals satisfy the asset equations:

$$\begin{aligned} \rho E - \dot{E} &= \ln(\beta\pi Y) + x(U - E) \\ \rho U - \dot{U} &= \ln(bY) + (m(u,v)/u)(E - U) \end{aligned}$$

Now the value functions take the following form

$$\begin{aligned} E &= \frac{1}{\rho}\left[\ln(\beta\pi) - \frac{x\ln(\beta\pi/b)}{1+x+\rho} + \frac{g}{\rho} + \ln Y\right] \text{ and} \\ U &= \frac{1}{\rho}\left[\ln(b) + \frac{\ln(\beta\pi/b)}{1+x+\rho} + \frac{g}{\rho} + \ln Y\right]. \end{aligned}$$

Using the above expressions for E and U, well-being can be shown to be equal to:

$$W^{u(c)=\ln c} = \frac{1}{\rho}\left[\frac{x}{1+x}\ln(b) + \frac{1}{1+x}\ln(\beta\pi)\right] + \frac{1}{\rho}\left[\frac{g}{\rho} + \ln Y\right]$$

This expression shows that for given growth rate well-being is affected more negatively by creative destruction than in the risk neutrality case: since here the agent is risk averse, more asymmetry between the returns when employed ($\beta\pi$) and when unemployed (b) lowers her well-being by more.

The net effect of creative destruction on well-being will ultimately depend upon the size of the asymmetry and upon the magnitude of the growth effect: in particular, if the unemployment benefit is too low relative to the wage rate, or if the growth effect is too small, then the overall effect of creative destruction on well-being is negative. More precisely:

Proposition 2 *When agents are risk averse with $U = \ln C$ and the unemployment benefit is sufficiently low, namely $b < \frac{\beta\pi}{\lambda^{1/\rho}}$, then a higher turnover rate x decreases life satisfaction W :*

$$\frac{\partial W^{u(c)=\ln c}}{\partial x} < 0.$$

This proposition states that, when agents are risk averse, job loss is perceived more detrimentally than when they are risk neutral. Consequently, there is a range of unemployment benefits for which higher turnover reduces life satisfaction for risk averse individuals with log preferences whereas it would increase life satisfaction for risk-neutral individuals:

$$\beta\pi\left[1 - \frac{\ln\lambda}{\rho}\right] < b < \frac{\beta\pi}{\lambda^{1/\rho}}$$

Finally, moving continuously from the baseline case where individuals are risk-neutral towards the risk-averse case where individuals have log preferences, makes the effect of creative destruction on life satisfaction become increasingly less positive (or increasingly more negative).[30]

D Endogeneizing the turnover rate

In this section of the Appendix, we endogeneize the turnover rate x. To this end, we first solve for the value function of posting a vacancy (V) and a filled vacancy (P) that is currently producing. If the cost of posting a vacancy is cY, which we think as the registration fee that has to be paid to the government, then we can write the value of a vacancy as

$$rV - \dot{V} = -cY + \frac{m}{v}\left[P - V\right].$$

Note that a vacancy is filled at the rate $\frac{m}{v}$. The value of a filled vacancy is

$$rP - \dot{P} = \pi Y + x\left[0 - P\right]$$

[30] More formally, if

$$W(x,\varepsilon) = (1-\varepsilon)W^{u(c)=c}(x) + \varepsilon W^{u(c)=\ln c}(x),$$

where

$$W^{u(c)=c} = \frac{Y}{r-g}\left[\beta\pi - \frac{xB}{1+x}\right]$$

is the equilibrium life satisfaction when individuals are risk neutral with $u(c) = c$ (see above), the variable ε reflects the degree of risk aversion, and we have

$$\frac{\partial^2 W}{\partial x \partial \varepsilon} < 0.$$

In steady state we get the following values

$$P = \frac{\pi Y}{r - g + x} \tag{17}$$

and

$$V = \frac{Y}{r - g + 1}\left[-c + \frac{\pi}{r - g + x}\right]. \tag{18}$$

Now we are ready to introduce free entry. There is a mass of outsiders enter at the flow of innovation x. Then the free entry condition is simply equates the value of vacancy to 0:

$$V = 0. \tag{19}$$

Then using (18) and (19) we find the entry rate as

$$x = \frac{\pi}{c} - r + g.$$

This equation is intuitive. The entry rate increases in flow profits and decreases in the cost of vacancy. Moreover, it increases in the equilibrium growth rate due to *capitalization* effect (it indicates that any formed business today will have higher future growth opportunities).

Recall that $r = \rho$ from the household maximization and $g = \frac{x}{1+x}\ln\lambda$. Hence equation (19) is reexpressed as

$$x = \frac{\pi}{c} - \rho + \frac{x}{1+x}\ln\lambda.$$

To ensure the existence of a unique equilibrium, it is sufficient to have the following assumption.

Assumption: The discounted sum of future profits is greater than cost of posting vacancy $\frac{\pi}{\rho} > c$.

Then the entry rate is implicitly determined as

$$x = \Pi + \frac{x}{1+x}\ln\lambda$$

where $\Pi \equiv \frac{\pi}{c} - \rho$. Hence

$$x = \frac{-(1 - \Pi - \ln\lambda) + \sqrt{(1 - \Pi - \ln\lambda)^2 + 4\Pi}}{2}. \tag{20}$$

Proposition 3 *There exists a unique entry rate x. Moreover, the equilibrium entry rate is increasing in profits π and innovation size λ and decreasing in the cost of posting vacancy c and discount rate ρ*

$$\frac{\partial x}{\partial \pi}, \frac{\partial x}{\partial \lambda} > 0 \quad \textit{and} \quad \frac{\partial x}{\partial \rho}, \frac{\partial x}{\partial c} < 0.$$

Table 1: (A) Summary statistics- MSA-level variables

	Observations	Mean	Standard deviation	Min	Max
MSA level averages of subjective well-being variables					
Life satisfaction (BRFSS, 2005-2010)	364	3.37	0.046	3.14	3.58
Current ladder (Gallup, 2008-2011)	363	6.74	0.187	6.15	7.51
Anticipated ladder (Gallup, 2008-2011)	363	7.97	0.187	7.42	8.48
Worry (Gallup, 2008-2011)	363	0.35	0.034	0.24	0.46
Creative destruction and unemployment rate					
2005-2010 averages (Table 2 panel A)					
Job turnover rate	366	0.29	0.035	0.18	0.43
Job creation rate	366	0.15	0.015	0.08	0.22
Job destruction rate	366	0.14	0.017	0.09	0.22
Unemployment rate	366	0.07	0.015	0.03	0.24
2008-2011 averages (Table 2 panel B and C, Table 3)					
Job turnover rate	366	0.26	0.036	0.16	0.41
Job creation rate	366	0.13	0.018	0.08	0.21
Job destruction rate	366	0.14	0.021	0.08	0.22
Unemployment rate	366	0.08	0.025	0.03	0.28

Table 1: (B) Summary statistics- Individual-level variables

	Mean	Standard deviation	Min	Max
Panel A: Gallup data, 2008-2011 Sample size: 836,805				
Subjective well-being				
Current ladder	6.86	1.99	0	10
Anticipated ladder	7.77	2.20	0	10
Worry	0.32	0.47	0	1
Individual covariates				
Female	0.51	0.49	0	1
Age	40	12.3	18	60
Married or partner	0.58	0.49	0	1
Black	0.14	0.34	0	1
Asian	0.02	0.15	0	1
Hispanic	0.15	0.36	0	1
Graduate school	0.14	0.35	0	1
College degree	0.20	0.40	0	1
Some college	0.25	0.43	0	1
High school	0.26	0.44	0	1
Technical degree	0.06	0.24	0	1
Less than high school	0.09	0.27	0	1
Panel B: BRFSS data, 2005-2010 Sample size: 964,869				
Subjective well-being				
Life satisfaction	3.37	0.63	1	4
Individual covariates				
Female	0.51	0.50	0	1
Age	39	11.9	18	60
Married or partner	0.65	0.48	0	1
Black	0.11	0.31	0	1
Asian	0.04	0.20	0	1
Hispanic	0.17	0.37	0	1
College or more	0.38	0.48	0	1
Some college	0.27	0.44	0	1
High school graduate or GED	0.25	0.43	0	1
High school dropout	0.06	0.24	0	1
No high school	0.04	0.19	0	1

Table 2: MSA-level averages - Life satisfaction

VARIABLES	(1)	(2)	(3)	(4)	(5)
	Subjective well-being				
Panel A: "How satisfied are you with your life?" (BRFSS, 2005-2010 averages)					
Unemployment rate	-1.496***		-1.694***		-1.519***
	(0.270)		(0.247)		(0.270)
Job turnover rate		0.121	0.347***		
		(0.0868)	(0.0785)		
Job creation rate				1.637***	0.847***
				(0.239)	(0.257)
Job destruction rate				-1.605***	-0.272
				(0.257)	(0.319)
Observations	364	364	364	364	364
R-squared	0.255	0.007	0.309	0.131	0.321
Panel B: Cantril ladder of life (Gallup data, 2008-2011 averages)					
Unemployment rate	-2.303***		-2.970***		-1.971***
	(0.731)		(0.730)		(0.757)
Job turnover rate		0.653*	1.377***		
		(0.365)	(0.379)		
Job creation rate				5.886***	4.713***
				(0.943)	(0.924)
Job destruction rate				-3.849***	-1.945**
				(0.842)	(0.983)
Observations	363	363	363	363	363
R-squared	0.097	0.016	0.158	0.163	0.211
Panel C: Anticipated Cantril ladder (Gallup data, 2008-2011 averages)					
Unemployment rate	-0.560		-1.485***		-1.007**
	(0.465)		(0.461)		(0.498)
Job turnover rate		1.549***	1.911***		
		(0.319)	(0.341)		
Job creation rate				4.107***	3.508***
				(0.850)	(0.854)
Job destruction rate				-0.652	0.321
				(0.759)	(0.884)
Observations	363	363	363	363	363
R-squared	0.006	0.087	0.122	0.122	0.134

Note: The dependent variables are MSA-level weighted averages of life satisfaction measures, coming either from the BRFSS (Panel A) or from Gallup (Panel B and C). The weights used to compute the MSA-level averages are the weights attached to each respondent by either the BRFSS or Gallup. The sample years are 2005-2010 for BRFSS and 2008-2011 for Gallup. The independent variables are averages across either 2005-2010 (Panel A) or 2008-2011 (Panel B and C) of MSA-level unemployment rates (column 1, 3 and 5), job turnover rates (column 2 and 3), job creation and job destruction rates (column 4 and 5). The unemployment rates come from the Bureau of Labor Statistics (Local Area Unemployment Statistics). The job creation and job destruction rates come from the Business Dynamics Statistics from the Census Bureau. The job creation (destruction) rate is the sum of all employment gains (losses) from expanding establishments from year (t-1) to year t including establishment startups, divided by the average employment in year t and (t-1). The job turnover rate is defined as the sum of the job creation rate and the job destruction rate. There is no additional control besides the coefficient displayed.

Table 3: MSA-level averages -Worry

VARIABLES	(1)	(2)	(3)	(4)	(5)
	Worry (Gallup data, 2008-2011 averages)				
Unemployment rate	0.462***		0.383***		0.258***
	(0.0812)		(0.0854)		(0.0952)
Job turnover rate		0.257***	0.163***		
		(0.0522)	(0.0565)		
Job creation rate				-0.405***	-0.251
				(0.152)	(0.158)
Job destruction rate				0.826***	0.576***
				(0.115)	(0.155)
Observations	363	363	363	363	363
R-squared	0.119	0.073	0.145	0.144	0.170

Note: The dependent variable is the MSA-level weighted average of the worry measure from Gallup. The weights used to compute the MSA-level averages are the weights attached to each respondent by Gallup. The sample years are 2008-2011. The independent variables are averages across the years 2008-2011 of MSA-level unemployment rates (column 1, 3 and 5), job turnover rates (column 2 and 3), job creation and job destruction rates (column 4 and 5). The unemployment rates come from the Bureau of Labor Statistics (Local Area Unemployment Statistics). The job creation and job destruction rates come from the Business Dynamics Statistics from the Census Bureau. The job creation (destruction) rate is the sum of all employment gains (losses) from expanding establishments from year (t-1) to year t including establishment startups, divided by the average employment in year t and (t-1). The job turnover rate is defined as the sum of the job creation rate and the job destruction rate. There is no additional control besides the coefficient displayed.

Table 4: Allowing for a non-linear effect of unemployment

VARIABLES	(1)	(2)	(3)	(4)
	Subjective well-being			
Panel A: "How satisfied are you with your life?" (BRFSS, 2005-2010 averages)				
Job turnover rate	0.121	0.301***		
	(0.0868)	(0.0733)		
Job creation rate			1.637***	0.505**
			(0.239)	(0.207)
Job destruction rate			-1.605***	0.0516
			(0.257)	(0.260)
Unemployment rate cubic polynomial		x		x
Observations	364	364	364	364
R-squared	0.007	0.376	0.131	0.378
Panel B: Cantril ladder of life (Gallup data, 2008-2011 averages)				
Job turnover rate	0.653*	1.309***		
	(0.365)	(0.348)		
Job creation rate			5.886***	4.100***
			(0.943)	(0.806)
Job destruction rate			-3.849***	-1.458*
			(0.842)	(0.844)
Unemployment rate cubic polynomial		x		x
Observations 363	363	363	363	
R-squared	0.016	0.279	0.163	0.315
Panel C: Anticipated Cantril ladder (Gallup data, 2008-2011 averages)				
Job turnover rate	1.549***	1.891***		
	(0.319)	(0.336)		
Job creation rate			4.107***	3.324***
			(0.850)	(0.862)
Job destruction rate			-0.652	0.471
			(0.759)	(0.883)
Unemployment rate cubic polynomial		x		x
Observations	363	363	363	363
R-squared	0.087	0.142	0.122	0.151
Panel D: Worry (Gallup data, 2008-2011 averages)				
Job turnover rate	0.257***	0.172***		
	(0.0522)	(0.0549)		
Job creation rate			-0.405***	-0.179
			(0.152)	(0.147)
Job destruction rate			0.826***	0.520***
			(0.115)	(0.142)
Unemployment rate cubic polynomial		x		x
Observations	363	363	363	363
R-squared	0.073	0.186	0.144	0.203

Note: Everything is similar to Tables 2 and 3, except that the unemployment rate is introduced in the regressions along with its square and its cube.
The dependent variables are MSA-level weighted averages of subjective wellbeing measures, coming either from BRFSS (Panel A) or from Gallup (Panel B, C and D). The weights used to compute the MSA-level averages are the weights attached to each respondent by either BRFSS or Gallup. The sample years are 2005-2010 for BRFSS and 2008-2011 for Gallup. The main independent variables are averages across either 2005-2010 (Panel A) or 2008-2011 (Panel B, C and D) of MSA-level job turnover rates (column 1 and 2), and of job creation and job destruction rates (column 3 and 4). In column 2 and 4, we control for a cubic polynomial of 2005-2010 or 2008-2011 averages of MSA-level unemployment rates. The unemployment rates come from the Bureau of Labor Statistics (Local Area Unemployment Statistics). The job creation and job destruction rates come from the Business Dynamics Statistics from the Census Bureau. The job creation (destruction) rate is the sum of all employment gains (losses) from expanding establishments from year (t-1) to year t including establishment startups, divided by the average employment in year t and (t-1). The job turnover rate is defined as the sum of the job creation rate and the job destruction rate. There is no additional control besides the variables mentioned in the tables.

Table 5: Controlling for MSA-level income per capita in Gallup

VARIABLES	(1)	(2)	(3)	(4)	(5)
	Current ladder (Gallup)				
Panel A: No controls besides coefficient displayed					
Unemployment rate	-2.303***		-2.970***		-1.971***
	(0.731)		(0.730)		(0.757)
Job turnover rate		0.653*	1.377***		
		(0.365)	(0.379)		
Job creation rate				5.886***	4.713***
				(0.943)	(0.924)
Job destruction rate				-3.849***	-1.945**
				(0.842)	(0.983)
Observations	363	363	363	363	363
R-squared	0.097	0.016	0.158	0.163	0.211
Panel B: controlling for average log of income as measured by Gallup					
Unemployment rate	-1.856***		-2.562***		-1.535**
	(0.388)		(0.407)		(0.775)
Job turnover rate		0.632**	1.267***		
		(0.265)	(0.271)		
Job creation rate				5.418***	4.639***
				(0.978)	(0.940)
Job destruction rate				-3.476***	-2.101**
				(0.864)	(0.958)
Ln income	0.205***	0.304***	0.163***	0.237***	0.169**
	(0.0612)	(0.0588)	(0.0602)	(0.0795)	(0.0829)
Observations	363	363	363	363	363
R-squared	0.124	0.083	0.175	0.203	0.229
Panel C: Controlling for log of average income per capita (BEA)					
Unemployment rate	-2.090***		-2.840***		-1.809**
	(0.740)		(0.751)		(0.772)
Job turnover rate		0.683*	1.401***		
		(0.367)	(0.396)		
Job creation rate				5.697***	4.722***
				(0.963)	(0.934)
Job destruction rate				-3.619***	-1.933*
				(0.853)	(0.987)
Ln income	0.0739	0.155**	0.0281	0.116*	0.0463
	(0.0762)	(0.0760)	(0.0748)	(0.0672)	(0.0685)
Observations	355	355	355	355	355
R-squared	0.107	0.059	0.166	0.185	0.219

Note: Panel A shows the benchmark results of table 2 Panel B, where the dependent variable is MSA-level weighted average of the current ladder of life measure from Gallup. Panel B and C each add a control for income but a different one. Panel B uses MSA-level averages of the log of income of each Gallup respondent, where income is defined as the midpoint of individual monthly income brackets assuming a log-normal distribution. Panel C uses the log of the average MSA-level income per capita over the period 2008-2011 as measured by the Bureau of Economic Analaysis.
Besides income, as in table 2, the independent variables are averages across the years 2008-2011 of MSA-level unemployment rates (column 1, 3 and 5), job turnover rates (column 2 and 3), job creation and job destruction rates (column 4 and 5). The unemployment rates come from the Bureau of Labor Statistics (Local Area Unemployment Statistics). The job creation and job destruction rates come from the Business Dynamics Statistics from the Census Bureau. The job creation (destruction) rate is the sum of all employment gains (losses) from expanding establishments from year (t-1) to year t including establishment startups, divided by the average employment in year t and (t-1). The job turnover rate is defined as the sum of the job creation rate and the job destruction rate. There is no additional control besides the coefficient displayed.

Table 6: Controlling for MSA-level income per capita in the BRFSS

VARIABLES	(1)	(2)	(3)	(4)	(5)
	Life satisfaction (BRFSS)				
Panel A: No controls besides coefficient displayed					
Unemployment rate	-1.496***		-1.694***		-1.519***
	(0.270)		(0.247)		(0.270)
Job turnover rate		0.121	0.347***		
		(0.0868)	(0.0785)		
Job creation rate				1.637***	0.847***
				(0.239)	(0.257)
Job destruction rate				-1.605***	-0.272
				(0.257)	(0.319)
Observations	364	364	364	364	364
R-squared	0.255	0.007	0.309	0.131	0.321
Panel B: controlling for average log of income as measured by the BRFSS					
Unemployment rate	-1.216***		-1.389***		-1.158***
	(0.284)		(0.252)		(0.266)
Job turnover rate		0.258***	0.377***		
		(0.0785)	(0.0787)		
Job creation rate				1.546***	0.979***
				(0.221)	(0.248)
Job destruction rate				-1.236***	-0.363
				(0.237)	(0.299)
Ln income	0.0616***	0.137***	0.0710***	0.124***	0.0758***
	(0.0150)	(0.0145)	(0.0146)	(0.0133)	(0.0146)
Observations	364	364	364	364	364
R-squared	0.284	0.186	0.347	0.275	0.364
Panel C: controlling for log of average income per capita (BEA)					
Unemployment rate	-1.446***		-1.676***		-1.472***
	(0.284)		(0.261)		(0.291)
Job turnover rate		0.113	0.349***		
		(0.0869)	(0.0799)		
Job creation rate				1.622***	0.883***
				(0.230)	(0.264)
Job destruction rate				-1.595***	-0.317
				(0.248)	(0.331)
Ln income	0.0151	0.0660***	0.00510	0.0623***	0.0112
	(0.0159)	(0.0177)	(0.0152)	(0.0162)	(0.0158)
Observations	355	355	355	355	355
R-squared	0.259	0.046	0.313	0.168	0.326

Note: Panel A shows the benchmark results from table 2 Panel A, where the dependent variable is MSA-level weighted average of the life satisfaction measure from the BRFSS. Panel B and C each add a control for income but a different one. Panel B uses MSA-level averages of the log of income of each BRFSS respondent, where income is defined as the midpoint of annual household income brackets assuming a log-normal distribution. Panel C uses the log of the average MSA-level income per capita over the period 2005-2010 as measured by the Bureau of Economic Analaysis.
Besides income, as in table 2, the independent variables are averages across the years 2005-2010 of MSA-level unemployment rates (column 1, 3 and 5), job turnover rates (column 2 and 3), job creation and job destruction rates (column 4 and 5). The unemployment rates come from the Bureau of Labor Statistics (Local Area Unemployment Statistics). The job creation and job destruction rates come from the Business Dynamics Statistics from the Census Bureau. The job creation (destruction) rate is the sum of all employment gains (losses) from expanding establishments from year (t-1) to year t including establishment startups, divided by the average employment in year t and (t-1). The job turnover rate is defined as the sum of the job creation rate and the job destruction rate. There is no additional control besides the coefficient displayed.

Table 7: Controlling for many potential MSA-level confounders

VARIABLES	(1)	(2)	(3)	(4)	(5)
	Subjective well-being				
Panel A: "How satisfied are you with your life?" (BRFSS, 2005-2010 averages)					
Unemployment rate	-1.163***		-1.344***		-1.104***
	(0.291)		(0.247)		(0.260)
Job turnover rate		0.361***	0.469***		
		(0.0838)	(0.0840)		
Job creation rate				1.662***	1.111***
				(0.230)	(0.257)
Job destruction rate				-1.167***	-0.327
				(0.238)	(0.307)
Ln income	0.0662***	0.155***	0.0889***	0.142***	0.0941***
	(0.0169)	(0.0173)	(0.0167)	(0.0151)	(0.0165)
Crime rate	x	x	x	x	x
Share of African Americans	x	x	x	x	x
Population	x	x	x	x	x
Observations	342	342	342	342	342
R-squared	0.292	0.226	0.384	0.319	0.403
Panel B: Cantril ladder of life (Gallup data, 2008-2011 averages)					
Unemployment rate	-1.797**		-2.428***		-1.392*
	(0.801)		(0.807)		(0.801)
Job turnover rate		0.724**	1.281***		
		(0.360)	(0.396)		
Job creation rate				5.405***	4.670***
				(0.990)	(0.954)
Job destruction rate				-3.343***	-2.107**
				(0.900)	(0.982)
Ln income	0.191	0.318***	0.177	0.246**	0.181*
	(0.118)	(0.108)	(0.112)	(0.0985)	(0.102)
Crime rate	x	x	x	x	x
Share of African Americans	x	x	x	x	x
Population	x	x	x	x	x
Observations	344	344	344	344	344
R-squared	0.143	0.108	0.194	0.229	0.251
Panel C: Anticipated Cantril ladder (Gallup data, 2008-2011 averages)					
Unemployment rate	-0.150		-1.039*		-0.671
	(0.569)		(0.551)		(0.562)
Job turnover rate		1.566***	1.804***		
		(0.300)	(0.321)		
Job creation rate				3.361***	3.006***
				(0.719)	(0.679)
Job destruction rate				0.00697	0.603
				(0.748)	(0.780)
Ln income	0.251***	0.291***	0.230***	0.263***	0.232***
	(0.0880)	(0.0740)	(0.0789)	(0.0725)	(0.0754)
Crime rate	x	x	x	x	x
Share of African Americans	x	x	x	x	x
Population	x	x	x	x	x
Observations	344	344	344	344	344
R-squared	0.345	0.427	0.443	0.444	0.449

Note: Everything is similar to table 2, except that we now include controls for: average log of income, population (in levels), crime rates and share of African-Americans.
Log of income is the MSA-level weighted average of the log of income of each BRFSS/Gallup respondent, where income is defined as the midpoint of income brackets assuming a log-normal distribution (monthly individual income for Gallup and annual household income for BRFSS). The share of African Americans is a weighted average of the number of respondents in the surveys that report being black in the race question. Weights use to compute MSA-level weighted averages are those attached to the respondent by BRFFS/Gallup. Population levels comes from the Bureau of Economic Analysis. Crime rates come from the FBI Crime statistics.
As in table 2, the dependent variables are MSA-level weighted averages of life satisfaction measures, coming either from the BRFSS (Panel A) or from Gallup (Panel B and C). Weights used to compute the MSA-level averages are the weights attached to each respondent by either BRFSS or Gallup. The sample years are 2005-2010 for BRFSS and 2008-2011 for Gallup. The main independent variables are averages across either 2005-2010 (Panel A) or 2008-2011 (Panel B, C and D) of MSA-level unemployment rates (column 2 and 4), job turnover rates (column 1 and 2), job creation and job destruction rates (column 3 and 4). The unemployment rates come from the Bureau of Labor Statistics (Local Area Unemployment Statistics). The job creation and job destruction rates come from the Business Dynamics Statistics from the Census Bureau. The job creation (destruction) rate is the sum of all employment gains (losses) from expanding establishments from year (t-1) to year t including establishment startups, divided by the average employment in year t and (t-1). The job turnover rate is defined as the sum of the job creation rate and the job destruction rate. There is no additional control besides the variables mentioned in the tables.

Table 8: Controlling for many potential MSA-level confounders

VARIABLES	(1)	(2)	(3)	(4)	(5)
	Worry (Gallup data, 2008-2011 averages)				
Unemployment_Rate	0.295***		0.220**		0.0781
	(0.0808)		(0.0850)		(0.0898)
Job turnover rate		0.203***	0.153***		
		(0.0510)	(0.0558)		
Job creation rate				-0.353***	-0.311**
				(0.134)	(0.143)
Job destruction rate				0.686***	0.617***
				(0.109)	(0.141)
Ln income	-0.0647***	-0.0792***	-0.0664***	-0.0706***	-0.0670***
	(0.0110)	(0.0108)	(0.0113)	(0.0100)	(0.0106)
Crime rate	x	x	x	x	x
Share of African Americans	x	x	x	x	x
Population	x	x	x	x	x
Observations	344	344	344	344	344
R-squared	0.253	0.254	0.276	0.307	0.310

Note: Everything is similar to table 3, except that we now include controls for: average log of income, population (in levels), crime rates and share of African-Americans.
Log of income is the MSA-level weighted average of the log of income of each Gallup respondent, where income is defined as the midpoint of monthly individual income brackets assuming a log-normal distribution. The share of African Americans is a weighted average of the number of respondents in the survey that report being black in the race question. Weights use to compute MSA-level weighted averages are those attached to the respondent by Gallup. Population levels comes from the Bureau of Economic Analysis. Crime rates come from the FBI Crime statistics.
As in table 3, the dependent variable is the MSA-level weighted average of the worry meaasure from Gallup. The weights used to compute the MSA-level averages are the weights attached to each respondent by Gallup. The sample years are 2008-2011. The independent variables are averages across the years 2008-2011 of MSA-level unemployment rates (column 1, 3 and 5), job turnover rates (column 2 and 3), job creation and job destruction rates (column 4 and 5). The unemployment rates come from the Bureau of Labor Statistics (Local Area Unemployment Statistics). The job creation and job destruction rates come from the Business Dynamics Statistics from the Census Bureau. The job creation (destruction) rate is the sum of all employment gains (losses) from expanding establishments from year (t-1) to year t including establishment startups, divided by the average employment in year t and (t-1). The job turnover rate is defined as the sum of the job creation rate and the job destruction rate. There is no additional control besides the coefficient displayed.

Table 9: Individual-level results; BRFSS data

VARIABLES	(1)	(2)	(3)	(4)	(5)
	"How satisfied are you with your life?"				
Panel A: Without individual controls					
Unemployment rate	-1.440***		-1.510***		-1.465***
	(0.174)		(0.172)		(0.179)
Job turnover rate		0.0299	0.155**		
		(0.0831)	(0.0653)		
Job creation rate				0.372***	0.241***
				(0.106)	(0.0898)
Job destruction rate				-0.344**	0.0527
				(0.137)	(0.105)
Year and Month F.E.	x	x	x	x	x
Observations	856,906	856,906	856,906	856,906	856,906
R-squared	0.002	0.000	0.002	0.000	0.002
Panel B: With individual level controls (age, education, race, gender, marital status)					
Unemployment rate	-0.811***		-0.898***		-0.860***
	(0.132)		(0.132)		(0.137)
Job turnover rate		0.127**	0.199***		
		(0.0558)	(0.0496)		
Job creation raten				0.351***	0.273***
				(0.0850)	(0.0770)
Job destruction rate				-0.119	0.112
				(0.0841)	(0.0740)
Year and Month F.E.	x	x	x	x	x
Observations	856,902	856,902	856,902	856,902	856,902
R-squared	0.074	0.073	0.074	0.073	0.074
Panel C: All individual level controls of Panel B + income					
Unemployment rate	-0.436***		-0.526***		-0.467***
	(0.125)		(0.123)		(0.124)
Job turnover rate		0.161***	0.204***		
		(0.0495)	(0.0462)		
Job creation rate				0.360***	0.318***
				(0.0823)	(0.0789)
Job destruction rate				-0.0571	0.0682
				(0.0763)	(0.0728)
Year and Month F.E.	x	x	x	x	x
Observations	780,169	780,169	780,169	780,169	780,169
R-squared	0.102	0.102	0.103	0.103	0.103

Note: The dependent variable is the BRFSS life satisfaction measure over the periode 2005-2010. Column (1) regresses it on the unemployment rate of the MSA the respondent lives in. Column (2) regresses it on the job turnover rate of the MSA the respondent lives in. Column (3) regresses it on both the unemployment and job turnover rates. Column (4) and (5) regress it on the MSA's job creation and job destruction rates introduced separately, respectively without and with a control for the MSA's unemployment rate. Standard errors are clustered at the MSA level. Year and month fixed effects are included in each regression. Panel A does not include any individual-level controls. Panel B includes basic demographic controls: age, age square, a dummy for being female, 7 dummies for family satus , 7 dummies for education, and race dummies (black, asian, white, other or missing). Panel C adds 8 dummies for annual household income brackets. All regressions are weighted by individual weights attached by the BRFSS to each respondent.

Table 10: Individual-level results; Gallup data - Current ladder

VARIABLES	(1)	(2)	(3)	(4)	(5)
	Current ladder				
Panel A: Without individual controls					
Unemployment rate	-3.020***		-3.600***		-3.426***
	(0.505)		(0.509)		(0.501)
Job turnover rate		0.340	1.035***		
		(0.299)	(0.279)		
Job creation rate				1.837***	1.614***
				(0.524)	(0.414)
Job destruction rate				-0.905***	0.491*
				(0.332)	(0.279)
Year and Month F.E.	x	x	x	x	x
Observations	668,386	668,386	668,386	668,386	668,386
R-squared	0.008	0.007	0.008	0.007	0.008
Panel B: With individual level controls (age, education, race, gender, marital status)					
Unemployment rate	-1.668***		-2.048***		-1.881***
	(0.425)		(0.434)		(0.426)
Job turnover rate		0.309	0.696***		
		(0.250)	(0.246)		
Job creation rate				1.380***	1.253***
				(0.428)	(0.373)
Job destruction				-0.580**	0.176
				(0.269)	(0.248)
Year and Month F.E.	x	x	x	x	x
Observations	666,983	666,983	666,983	666,983	666,983
R-squared	0.063	0.063	0.063	0.063	0.063
Panel C: All individual level controls of Panel B + income					
Unemployment rate	-1.236***		-1.401***		-1.239***
	(0.421)		(0.444)		(0.447)
Job turnover rate		0.0374	0.304		
		(0.227)	(0.226)		
Job creation rate				0.934**	0.858**
				(0.374)	(0.348)
Job destruction rate				-0.712**	-0.216
				(0.282)	(0.281)
Year and Month F.E.	x	x	x	x	x
Observations	556,300	556,300	556,300	556,300	556,300
R-squared	0.930	0.103	0.103	0.103	0.103

Note: The dependent variable is the Cantril ladder of life from Gallup over the periode 2008-2011. Column (1) regresses it on the unemployment rate of the MSA the respondent lives in. Column (2) regresses it on the job turnover rate of the MSA the respondent lives in. Column (3) regresses it on both the unemployment and job turnover rates. Column (4) and (5) regress it on the MSA's job creation and job destruction rates introduced separately, respectively without and with a control for the MSA's unemployment rate. Standard errors are clustered at the MSA level. Year and month fixed effects are included in each regression. Panel A does not include any individual-level controls. Panel B includes basic demographic controls: age, age square, a dummy for being female, 6 dummies for marital status, 6 dummies for education and race dummies (black, asian, white). Panel C adds 9 dummies for individual monthly income brackets. All regressions are weighted by individual weights attached by Gallup to each respondent.

Table 11: Individual-level results; Gallup data - Anticipated ladder

VARIABLES	(1)	(2)	(3)	(4)	(5)
	Anticipated ladder				
Panel A: Without individual controls					
Unemployment rate	-0.675		-1.785***		-1.663***
	(0.493)		(0.435)		(0.427)
Job turnover		1.632***	1.974***		
		(0.240)	(0.259)		
Job creation rate				2.488***	2.379***
				(0.396)	(0.346)
Job destruction rate				0.921***	1.595***
				(0.319)	(0.339)
Year and Month F.E.	x	x	x	x	x
Observations	650,625	650,625	650,625	650,625	650,625
R-squared	0.003	0.004	0.004	0.004	0.004
Panel B: With individual level controls (age, education, race, gender, marital status)					
Unemployment rate	0.329		-0.311		-0.279
	(0.286)		(0.257)		(0.253)
Job turnover rate		1.110***	1.168***		
		(0.133)	(0.133)		
Job creation rate				1.294***	1.275***
				(0.206)	(0.200)
Job destruction rate				0.956***	1.068***
				(0.216)	(0.207)
Year and Month F.E.	x	x	x	x	x
Observations	649,329	649,329	649,329	649,329	649,329
R-squared	0.083	0.083	0.084	0.083	0.084
Panel C: All individual level controls of Panel B + income					
Unemployment rate	0.571**		0.0386		0.0563
	(0.254)		(0.268)		(0.272)
Job turnover rate		0.984***	0.976***		
		(0.124)	(0.135)		
Job creation rate				1.033***	1.037***
				(0.208)	(0.206)
Job destruction rate				0.942***	0.920***
				(0.199)	(0.212)
Year and Month F.E.	x	x	x	x	x
Observations	544,228	544,228	544,228	544,228	544,228
R-squared	0.094	0.094	0.094	0.094	0.094

Note: The dependent variable is the anticipated Cantril ladder from Gallup over the periode 2008-2011. Column (1) regresses it on the unemployment rate of the MSA the respondent lives in. Column (2) regresses it on the job turnover rate of the MSA the respondent lives in. Column (3) regresses it on both the unemployment and job turnover rates. Column (4) and (5) regress it on the MSA's job creation and job destruction rates introduced separately, respectively without and with a control for the MSA's unemployment rate. Standard errors are clustered at the MSA level. Year and month fixed effects are included in each regression. Panel A does not include any individual-level controls. Panel B includes basic demographic controls: age, age square, a dummy for being female, 6 dummies for marital status, 6 dummies for education and race dummies (black, asian, white). Panel C adds 9 dummies for individual monthly income brackets. All regressions are weighted by individual weights attached by Gallup to each respondent.

Table 12: Individual-level results; Gallup data - Worry

VARIABLES	(1)	(2)	(3)	(4)	(5)
			Worry		
Panel A: Without individual controls					
Unemployment rate	0.531***		0.481***		0.477***
	(0.0736)		(0.0767)		(0.0774)
Job turnover rate		0.181***	0.0878*		
		(0.0486)	(0.0455)		
Job creation rate				0.0413	0.0721
				(0.0752)	(0.0630)
Job destruction rate				0.297***	0.103*
				(0.0578)	(0.0557)
Year and month F.E.	x	x	x	x	x
Observations	669,605	669,605	669,605	669,605	669,605
R-squared	0.001	0.001	0.001	0.001	0.001
Panel B: With individual level controls (age, education, race, gender, marital status)					
Unemployment rate	0.349***		0.293***		0.288***
	(0.0683)		(0.0711)		(0.0721)
Job turnover rate		0.159***	0.104**		
		(0.0439)	(0.0434)		
Job_creation rate				0.0703	0.0897
				(0.0684)	(0.0622)
Job destruction rate				0.233***	0.117**
				(0.0518)	(0.0526)
Year and month F.E.	x	x	x	x	x
Observations	668,204	668,204	668,204	668,204	668,204
R-squared	0.018	0.018	0.018	0.018	0.018
Panel C: All individual level controls of Panel B + income					
Unemployment rate	0.278***		0.188**		0.186**
	(0.0741)		(0.0760)		(0.0771)
Job turnover rate		0.201***	0.166***		
		(0.0435)	(0.0436)		
Job creation rate			0.149**	0.160**	
				(0.0656)	(0.0623)
Job destruction rate				0.245***	0.171***
				(0.0549)	(0.0554)
Year and month F.E.	x	x	x	x	x
Observations	556,966	556,966	556,966	556,966	556,966
R-squared	0.034	0.034	0.034	0.034	0.034

Note: The dependent variable is the Gallup measure of worry over the periode 2008-2011. Column (1) regresses it on the unemployment rate of the MSA the respondent lives in. Column (2) regresses it on the job turnover rate of the MSA the respondent lives in. Column (3) regresses it on both the unemployment and job turnover rates. Column (4) and (5) regress it on the MSA's job creation and job destruction rates introduced separately, respectively without and with a control for the MSA's unemployment rate. Standard errors are clustered at the MSA level. Year and month fixed effects are included in each regression. Panel A does not include any individual-level controls. Panel B includes basic demographic controls: age, age square, a dummy for being female, 6 dummies for marital status, 6 dummies for education and race dummies (black, asian, white). Panel C adds 9 dummies for individual monthly income brackets. All regressions are weighted by individual weights attached by Gallup to each respondent.

Table 13: Robustness checks - Pre-crisis v. "crisis" years - MSA-level averages -

VARIABLES	(1)	(2)	(3)	(4)	(5)
			"How satisfied are you with your life?" (BRFSS)		
Panel A: 2005-2007					
Unemployment rate	-1.741***		-1.825***		-1.602***
	(0.315)		(0.295)		(0.267)
Job turnover rate		0.0938	0.185***		
		(0.0826)	(0.0686)		
Job creation rate				0.935***	0.718***
				(0.169)	(0.169)
Job destruction rate				-1.116***	-0.607***
				(0.247)	(0.223)
Observations	364	364	364	364	364
R-squared	0.146	0.004	0.161	0.077	0.189
Panel B: 2008-2010 averages					
Unemployment rate	-1.191***		-1.359***		-1.465***
	(0.204)		(0.203)		(0.248)
Job turnover rate		0.0441	0.336***		
		(0.120)	(0.118)		
Job creation rate				0.780***	0.0505
				(0.274)	(0.265)
Job destruction rate				-0.538**	0.602**
				(0.235)	(0.278)
Observations	364	364	364	364	364
R-squared	0.192	0.001	0.224	0.032	0.228

Note: The dependent variables are MSA-level weighted averages of the life satisfaction measure from the BRFSS. The weights used to compute the MSA-level averages are the weights attached to each respondent in the BRFSS. The sample years are 2005-2007 in Panel A and 2008-2010 in Panel B. The independent variables are averages across either 2005-2007 (Panel A) or 2008-2010 (Panel B) of MSA-level unemployment rates (column 1, 3 and 5), job turnover rates (column 2 and 3), job creation and job destruction rates (column 4 and 5). The unemployment rates come from the Bureau of Labor Statistics (Local Area Unemployment Statistics). The job creation and job destruction rates come from the Business Dynamics Statistics from the Census Bureau. The job creation (destruction) rate is the sum of all employment gains (losses) from expanding establishments from year (t-1) to year t including establishment startups, divided by the average employment in year t and (t-1). The job turnover rate is defined as the sum of the job creation rate and the job destruction rate. There is no additional control besides the coefficient displayed.

Table 14: Robustness checks - Longitudinal Employer Household data

VARIABLES	(1)	(2)	(3)	(4)	(5)
Panel A : "How satisfied are you with your life?" (BRFSS)					
Unemployment rate	-1.504***		-1.688***		-1.607***
	(0.270)		(0.216)		(0.228)
Job turnover rate (all jobs)		0.0645*	0.179***		
		(0.0381)	(0.0367)		
Job turnover rate (stable jobs)				0.139***	0.229***
				(0.0497)	(0.0478)
Observations	357	357	357	357	357
R-squared	0.257	0.008	0.309	0.020	0.306
Panel B : Current ladder of life (Gallup)					
Unemployment rate	-2.303***		-2.859***		-2.445***
	(0.731)		(0.572)		(0.623)
Job turnover rate (all jobs)		0.599***	0.879***		
		(0.144)	(0.177)		
Job turnover rate (stable jobs)				0.807***	0.909***
				(0.185)	(0.204)
Observations	359	359	359	359	359
R-squared	0.097	0.042	0.182	0.043	0.152

Note: The dependent variables are MSA-level weighted averages of life satisfaction measures, coming either from the BRFSS (Panel A) or from Gallup (Panel B). The weights used to compute the MSA-level averages are the weights attached to each respondent by either the BRFSS or Gallup. The sample years are 2005-2010 for BRFSS and 2008-2011 for Gallup. The independent variables are averages across either 2005-2010 (Panel A) or 2008-2011 (Panel B) of MSA-level unemployment rates (column 1, 3 and 5), and job turnover rates (column 2, 3, 4 and 5). The unemployment rates come from the Bureau of Labor Statistics (Local Area Unemployment Statistics). The job turnover rates come from the Longitudinal Employer Household Dynamics Data. Job turnover is defined as the sum of the job creation rate and the job destruction rate. The job creation (destruction) rate is the number of workers who started a new job (lost a job) during quarter t, divided by the average employment in that quarter (defined as the sum of employment on the first day and employment on the last day divided by 2). The job turnover for stable jobs is defined similarly exept that only jobs that lasted more than one quarter are counted. There is no additional control besides the coefficient displayed.

Table 15: Robustness checks - Predicted turnover rate

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	Quarterly MSA-level averages of the Cantril ladder					
Panel A: All jobs						
Actual	0.537***	0.717***	0.317**			
job turnover	(0.0857)	(0.0934)	(0.127)			
Predicted				0.586***	1.538***	1.552***
job turnover				(0.200)	(0.225)	(0.517)
Unemployment Rate		x	x		x	x
MSA F.E.			x			x
Year and quarter F.E	x	x	x	x	x	x
Observations	5,584	5,584	5,584	5,584	5,584	5,584
R-squared	0.144	0.170	0.292	0.137	0.166	0.292
Panel B: Stable jobs						
Actual	0.823***	0.937***	0.485***			
job turnover	(0.111)	(0.113)	(0.188)			
Predicted				0.606**	1.715***	1.216*
job turnover				(0.301)	(0.326)	(0.737)
Unemployment Rate		x	x		x	x
MSA F.E.			x			x
Year and quarter F.E	x	x	x	x	x	x
Observations	5,584	5,584	5,584	5,584	5,584	5,584
R-squared	0.146	0.169	0.292	0.137	0.162	0.291

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: The dependent variable is quarterly MSA-level averages of the current Cantril ladder in Gallup. Column (1) to (3) use the actual quarterly job turnover rate from the Longitudinal Employer Household Dynamics. Column (4) to (6) use a predicted measure of the job turnover rate. Panel B shows the results when we use only jobs that lasted more than a quarter to compute the job creation and destruction rates (and thus the job turnover rate), whereas Panel A shows the results when we use all jobs to compute the job creation and destruction rates. The predicted variable is defined as follows: we take quarterly job turnover rates by sector at the national level from the Longitudinal Employer Household Dynamics, and for each MSA we compute a weighted average of these national sectoral rates where weights correspond to the share of the MSA's total employment that the sector represents in 2004. The sectoral composition of employment by MSA used for the weights comes from the Longitudinal Employer Household Dynamics.
All regressions include year and quarter fixed effects. Column (3) and (6) add MSA fixed effects.Column (1) and (4) are without controling for the annual MSA unemployment rate. Standard errors are clustered at the MSA-level.

Table 16: Interactions with productivity growth

VARIABLES	(1)	(2)	(3)	(4)
	Life satisfaction (BRFSS)			
Above median * Job turnover	0.154**	0.146**		
	(0.0711)	(0.0711)		
Job turnover rate	0.0786	0.157***		
	(0.0599)	(0.0604)		
Above median * Job destruction			0.190*	0.145
			(0.107)	(0.108)
Job destruction rate			-0.201**	0.0815
			(0.0937)	(0.0969)
Above median * Job creation			0.145	0.151
			(0.0986)	(0.0986)
Job creation rate			0.315***	0.216**
			(0.0896)	(0.0898)
Above median TFP growth	-0.0552***	-0.0554***	-0.0585***	-0.0559***
	(0.0200)	(0.0199)	(0.0199)	(0.0199)
Unemployment rate		x		x
Individual controls	x	x	x	x
Year and Month F.E.	x	x	x	x
Observations	825,298	825,298	825,298	825,298
R-squared	0.065	0.066	0.065	0.066

Note: The dependent variable is the BRFSS measure of life satisfaction over the periode 2005-2010. The independent variables are measures of creative destruction from the Business Dynamics Statistics (either the job creation rate and the job destuction rate or the sum of the two), a measure of whether predominant sectors in the MSA experience more or less productivity growth and interaction terms between the creative destruction variables and the productivity growth measure. The productivity growth measure of an MSA is computed as follows: we take the 5 factors TFP annual growth by sector at the national level from the NBER-CES Manufacturing Industry Database (which is only available until 2009 so we use an average over 2005-2009), and for each MSA we compute a weighted average of these national sectoral rates where weights correspond to the share of the MSA's total employment that the sector represents (on average over the period 2005-2009). The sectoral composition of employment by MSA used for the weights comes from the Longitudinal Employer Household Dynamics. Column (1) and (2) use the job turnover rate (the sum of the job creation and the job destruction rate) whereas column (3) and (4) introduce the job creation and the job destruction rate separately. Column(2) and (4) control for the MSA's unemployment rate whereas column(1) and (3) do not. Standard errors are clustered at the MSA level. Year and month fixed effects are introduced in all regressions as well as individual controls:age, age square, a dummy for being female, a dummy for being married or having a partner, a dummy for having some college or more and race dummies (black, asian, hispanic).

Table 17: Interactions with outsourcing threat

VARIABLES	(1)	(2)	(3)	(4)
	"How satisfied are you with your life?" (BRFSS)			
Above median * Job turnover	-0.160**	-0.181***		
	(0.0657)	(0.0656)		
Job turnover rate	0.235***	0.316***		
	(0.0483)	(0.0485)		
Above median * Job destruction			-0.290***	-0.323***
			(0.105)	(0.104)
Job destruction rate			0.0725	0.332***
			(0.0902)	(0.0922)
Above median * Job creation			-0.0347	-0.0554
			(0.0906)	(0.0906)
Job creation rate			0.388***	0.309***
			(0.0737)	(0.0735)
Outsourcing above median	0.0525***	0.0580***	0.0538***	0.0625***
	(0.0189)	(0.0188)	(0.0192)	(0.0192)
Unemployment rate		x		x
Individual controls	x	x	x	x
Year and Month F.E.	x	x	x	x
Observations	825,298	825,298	825,298	825,298
R-squared	0.065	0.066	0.065	0.066

Note: The depdendent variable is the BRFSS measure of life satisfaction over the periode 2005-2010. The independent variables are measures of creative destruction from the Business Dynamics Statistics (either the job creation rate and the job destruction rate or the sum of the two), a measure of whether predominant sectors in the MSA are more or less prone to outsource their activity and interaction terms between the creative destruction variables and the measure of the outsourcing threat. The outsourcing threat measure of an MSA is computed as follows: following Autor et al. (AER, 2013), we take the growth of imports from China by sectors, and for each MSA we compute a weighted average of these national sectoral import growth rates where weights correspond to the share of the MSA's total employment that the sector represents (we average these shares over the whole period 2005-2010). The sectoral composition of employment by MSA used for the weights comes from the Longitudinal Employer Household Dynamics. Column (1) and (2) use the job turnover rate (the sum of the job creation and the job destruction rate) whereas column (3) and (4) introduce the job creation and the job destruction rate separately. Column(2) and (4) control for the MSA's unemployment rate whereas column(1) and (3) do not. Standard errors are clustered at the MSA level. Year and Month fixed effects are introduced in all regressions as well as individual controls: age, age square, a dummy for being female, a dummy for being married or having a partner, a dummy for having some college or more and race dummies (black, asian, hispanic).

Table 18: Interactions with generosity of unemployment benefits

VARIABLES	(1)	(2)	(3)	(4)
	"Current ladder" (Gallup)			
Above median * Job turnover	1.411**	1.784***		
	(0.637)	(0.680)		
Job turnover rate	-0.118	0.433		
	(0.529)	(0.512)		
Above median * Job destruction			3.708***	4.526***
			(1.395)	(1.507)
Job destruction rate			-5.380***	-3.524***
			(0.946)	(1.077)
Above median * Job creation			-1.484	-1.734
			(1.689)	(1.497)
Job creation rate			6.186***	4.900***
			(0.993)	(1.057)
Above median UI	-0.277*	-0.382**	-0.256	-0.330**
	(0.166)	(0.175)	(0.159)	(0.165)
Unemployment rate		x		x
Observations	363	363	363	363
R-squared	0.093	0.237	0.216	0.281

Note: The dependent variable is MSA-level weighted averages of answers to the current ladder of life question. The weights used to compute the MSA-level averages are the weights attached to each respondent by Gallup. The sample years are 2008-2011. The independent variables are 2008-2011 averages of MSA-level job turnover rates (column 1 and 2), job creation and job destruction rates (column 3 and 4) and unemployment rates (column 2 and 4), interacted with whether the MSA is located in a state above median in terms of UI generosity, controlling for the direct effect of being located in such an above median state. A state's UI generosity is measured by the average maximum weekly benefit amount over the period 2008-2011. The unemployment rates come from the Bureau of Labor Statistics (Local Area Unemployment Statistics). The job creation and job destruction rates come from the Business Dynamics Statistics from the Census Bureau. The job creation (destruction) rate is the sum of all employment gains (losses) from expanding establishments from year (t-1) to year t including establishment startups, divided by the average employment in year t and (t-1). The job turnover rate is defined as the sum of the job creation rate and the job destruction rate. There is no additional control besides the coefficient displayed.

Table 19: Unemployment benefits prediction ct'ed

VARIABLES	(1)	(2)	(3)	(4)	(5)
	Current ladder (Gallup)				
Panel A: States above median in terms of UI generosity					
Unemployment rate	-1.357**		-2.390***		-1.940***
	(0.678)		(0.654)		(0.736)
Job turnover rate		1.299***	2.039***		
		(0.356)	(0.410)		
Job creation rate				4.701***	3.415***
				(1.371)	(1.303)
Job destruction rate				-1.670	0.576
				(1.036)	(1.328)
Observations	173	173	173	173	173
R-squared	0.048	0.072	0.198	0.150	0.209
Panel B: States below median					
Unemployment rate	-3.644**		-3.915***		-2.857*
	(1.402)		(1.463)		(1.486)
Job turnover rate		-0.115	0.597		
		(0.529)	(0.511)		
Job creation rate				6.203***	4.579***
				(0.985)	(1.374)
Job destruction rate				-5.375***	-3.070**
				(0.934)	(1.487)
Observations	190	190	190	190	190
R-squared	0.187	0.000	0.199	0.175	0.261

Note: The dependent variable is MSA-level weighted averages of answers to the current ladder of life question. The weights used to compute the MSA-level averages are the weights attached to each respondent by Gallup. The sample years are 2008-2011. Panel A restricts attention to MSAs located in states above median in terms of UI generosity whereas Panel B focuses on MSAs in states below median. A state's UI generosity is measured by the average maximum weekly benefit amount over the period 2008-2011. The independent variables are 2008-2011 averages of MSA-level unemployment rates (column 1, 3 and 5), job turnover rates (column 2 and 3), job creation and job destruction rates (column 4 and 5). The unemployment rates come from the Bureau of Labor Statistics (Local Area Unemployment Statistics). The job creation and job destruction rates come from the Business Dynamics Statistics from the Census Bureau. The job creation (destruction) rate is the sum of all employment gains (losses) from expanding establishments from year (t-1) to year t including establishment startups, divided by the average employment in year t and (t-1). The job turnover rate is defined as the sum of the job creation rate and the job destruction rate. There is no additional control besides the coefficient displayed.

Table 20: Discount rate prediction - Young v. Old

VARIABLES	(1)	(2)	(3)	(4)	(5)
	Current ladder (Gallup)				
Panel A: Age below median (Median age is 40)					
Unemployment rate	-1.683**		-2.358***		-1.438*
	(0.827)		(0.834)		(0.870)
Job turnover rate		0.819**	1.394***		
		(0.409)	(0.430)		
Job creation rate				5.320***	4.464***
				(0.916)	(0.921)
Job destruction rate				-3.053***	-1.664
				(0.959)	(1.101)
Observations	363	363	363	363	363
R-squared	0.043	0.020	0.095	0.111	0.132
Panel B: Age above median					
Unemployment rate	-2.815***		-3.374***		-2.369***
	(0.606)		(0.612)		(0.653)
Job turnover rate		0.333	1.156***		
		(0.363)	(0.370)		
Job creation rate				5.923***	4.513***
				(1.083)	(1.069)
Job destruction rate				-4.475***	-2.188**
				(0.838)	(1.019)
Observations	363	363	363	363	363
R-squared	0.122	0.003	0.158	0.144	0.202

Note: The dependent variable is MSA-level weighted averages of answers to the current ladder of life question from Gallup for either respondents of age below median (Panel A) or respondents of age above median (Panel B). The weights used to compute the MSA-level averages are the weights attached to each respondent by Gallup. The sample years are 2008-2011. The independent variables are 2008-2011 averages of MSA-level unemployment rates (column 1, 3 and 5), job turnover rates (column 2 and 3), job creation and job destruction rates (column 4 and 5). The unemployment rates come from the Bureau of Labor Statistics (Local Area Unemployment Statistics). The job creation and job destruction rates come from the Business Dynamics Statistics from the Census Bureau. The job creation (destruction) rate is the sum of all employment gains (losses) from expanding establishments from year (t-1) to year t including establishment startups, divided by the average employment in year t and (t-1). The job turnover rate is defined as the sum of the job creation rate and the job destruction rate. There is no additional control besides the coefficient displayed.

Online Appendix:

Creative Destruction and Subjective Well-Being

by Aghion, Akcigit, Deaton, and Roulet

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Not for Publication Unless Requested

OA-1 Sufficient Condition for Exit in Section 2.1.2.

Denote the value of an incumbent before entry by V_1 and after entry V_2. Then we can express these value functions as

$$rV_1 - \dot{V}_1 = \pi Y + x\left(V_2 - V_1\right), \text{ and } rV_2 - \dot{V}_2 = \pi Y + \frac{m}{v}\left(0 - V_2\right).$$

Since in equilibrium $m = v$, we get

$$V_2 = \frac{\pi Y}{1 + r - g}. \tag{OA-1}$$

Then we can express V_1 as

$$V_1 = \frac{(1-\beta)\pi Y + xV_2}{x + r - g} \tag{OA-2}$$

Note that (OA-1) implies $\pi Y = (1 + r - g)\, V_2$. Substitute this into (OA-2) :

$$V_1 = V_2 + \frac{V_2}{x + r - g} > V_2.$$

Hence any outside option O such that $V_1 > O > V_2$:

$$\frac{\pi Y}{1 + r - g}\left(1 + \frac{1}{x + r + g}\right) > O > \frac{\pi Y}{1 + r - g}$$

implies the incumbent firm will exit as soon as there is a new entrant. This is what we assume throughout our analysis.

OA-2 Derivation of Equation (10) .

Note that using the fact that in steady state $\dot{E} = gE$ and $\dot{U} = gU$,and after subtracting the second equation from the first:

$$(r - g)(E - U) = BY + (1 + x)(U - E),$$

where $B \equiv \beta\pi - b$.

This yields:

$$E - U = \frac{BY}{r - g + 1 + x}.$$

Then, substituting for $(E - U)$ in the above asset equations (8) and (9), yields:

$$U = \left[bY + \frac{BY}{r - g + 1 + x}\right] \frac{1}{r - g}; \text{ and } E = \left[\beta\pi Y - \frac{xBY}{r - g + 1 + x}\right] \frac{1}{r - g}.$$

so that, after substituting for E and U in the expression for W, and using the fact that in equilibrium $u = x/(1 + x)$, we get:

$$W = \frac{Y}{r - g}\left[\beta\pi - \frac{xB}{1 + x}\right].$$

OA-3 Derivation of Equation (11).

Recall that:

$$W = uU + (1 - u)E,$$

where E and U are expressed in (8) and (9). Now, using the fact that $m(u, v)/u = (1 - u)x/u$ and that in steady state $\dot{E} = gE$ and $\dot{U} = gU$, we obtain:

$$E - U = \frac{BY}{r - g + x/u}.$$

Substituting for $(E - U)$ in the asset equations (8) and (9), yields:

$$U = \left[bY + \frac{[(1 - u)x/u]BY}{r - g + x/u}\right] \frac{1}{r - g},$$

and

$$E = \left[\beta\pi Y - \frac{xBY}{r - g + x/u}\right] \frac{1}{r - g}.$$

so that:

$$W = \frac{Y}{r - g}[ub + (1 - u)\beta\pi].$$

OA-4 Proof of Lemma 1

The output in this economy is

$$\ln Y_t = \int_{j \in \mathcal{J}} \ln A_{jt} dj \equiv (1 - u) \ln \bar{A}_t$$

Then after a small time interval Δt :

$$\begin{aligned}
\ln Y_{t+\Delta t} &= \int_{\mathcal{J}} [x\Delta t \times 0 + (1 - x\Delta t) \ln A_{jt}]\, dj + \int_{\mathcal{J}'} \left[\frac{m}{v}\Delta t \ln(1 + \lambda)\, \bar{A}_t + \left(1 - \frac{m}{v}\Delta t\right) \times 0\right] dj \\
&= (1 - x\Delta t)(1 - u) \ln \bar{A}_t + u\frac{m}{v}\Delta t \ln(1 + \lambda)\, \bar{A}_t \\
&= [1 - u] \ln \bar{A}_t + m\Delta t \ln(1 + \lambda)
\end{aligned}$$

Hence we can find the growth rate as

$$g = \lim_{\Delta t \to 0} \frac{\ln Y_{t+\Delta t} - \ln Y_t}{\Delta t} = m \ln (1 + \lambda)$$