Impact of income uncertainty on health outcomes

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What we do:

- ▶ Data from the Longitudinal and International Study of Adults (LISA)

    - ▶ Health and well-being measurement (2012-2014)
    - ▶ Total family income from administrative data (1982-2012).

1. For each respondent, we estimate variances of the permanent and the transitory components of income.

2. Controlling for the average level of income, we estimate the effect of income uncertainty over a working-age period on :

    - ▶ Mental health
    - ▶ Well-being
    - ▶ Self-Assessed Health

- ▶ **Preview of Finding:** Transitory income uncertainty deteriorates mental health and well-being, as well as self-assessed health.

Sample Selection (Variances)

Aged 30 to 55 years old between 1982 and 2012:

▶ No longer at school and are not yet retired.

Male

▶ Having a child might induce income variations for individuals and especially for women.

▶ No information on having or not.

▶ Not possible to find states aid for all parents without income requirements.

Not retired between 30 and 55 years old

▶ We have information on the year when the respondent retired.

Non-missing income information (T1FF)

⇒ **A total of 6,933 respondents, 3,666 (2012); 3,267 (2014)**

Income measure

Total Family income before taxes: Taxfiler's income from taxable as well as non-taxable sources.

▶ Deflated using the Consumer Price Index (2013 base year).

▶ Family income allows to control for insurance effects between household's members. When in couple, individual income can:

  ▶ Underestimate variances of disposable income (if job loss of spouse).

  ▶ Overestimate the variances of disposable income (if spouse has a stable job).

Estimating variances of permanent and transitory shocks

Logarithm of permanent income:

$$inc_{it} = \gamma p_{it} + inc_{it-1} + \eta_{it} \quad \forall t, i \tag{1}$$

Logarithmic transformation of current income:

$$y_{it} = inc_{it} + \epsilon_{it}. \tag{2}$$

Income difference between d years as:

$$
\begin{aligned}
r_{id} &= y_{it+d} - y_{it} \\
&= inc_{it+d} + \epsilon_{it+d} - inc_{it} - \epsilon_{it} \tag{3}
\end{aligned}
$$

Estimating variances of permanent and transitory shocks

Recursively substituting equation (1):

$$r_{id} = (\eta_{it+1} + \eta_{it+2} + ... + \eta_{it+d}) + \epsilon_{it+d} - \epsilon_{it} \qquad (4)$$

Variance of equation (4) is given by:

$$\begin{aligned} Var(r_{id}) &= d\sigma_{i\eta}^2 + 2\sigma_{i\epsilon}^2 \\ &= r_{id}^2 \end{aligned} \qquad (5)$$

Estimating variances of permanent and transitory shocks

For each respondent:

1. Remove the predictable growth from the income process by doing, for each respondent, an OLS on:

   - age_t, age_t^2, age_t^3
   - *Marital Status$_t$*: Married or common law.
   - Health: *Disability$_t$*
     - Taxfiler may claim a preset disability amount if severely he was physically or mentally impaired in the tax year (ADL)
     - The individual concerned must have a certificate for a tax credit (health assessment made by a physician).

2. Construct the set of all possible r_d^2.

3. Estimate σ_η^2 and σ_ϵ^2 by doing an estimation of r_d^2 on d and 2.

- Allowing for serial correlation in terms of order MA(2), we restrict d to be greater than 2 (MaCurdy (1982), Abowd & Card (1989) and Moffitt & Gottschalk (2011)).

	σ_η^2	σ_ϵ^2
Total sample	0.0013	0.0528
	(0.0052)	(0.0725)
Level of education		
No diploma	0.0012	0.0554
	(0.0041)	(0.0623)
High school	0.0012	0.0544
	(0.0044)	(0.0756)
College	0.0009	0.0459
	(0.0026)	(0.0599)
University	0.0019	0.0539
	(0.0077)	(0.0823)
Province		
Atlantiques	0.0011	0.0479
	(0.0033)	(0.0628)
Quebec	0.0009	0.0437
	(0.0035)	(0.0546)
Ontario	0.0015	0.0551
	(0.0065)	(0.0729)
Prairies	0.0013	0.0547
	(0.0044)	(0.0766)
British Columbia	0.0016	0.0638
	(0.0052)	(0.0945)
Number of unemployment insurance episode		
0	0.0013	0.0431
	(0.0058)	(0.0670)
1+	0.0013	0.0610
	(0.0045)	(0.0759)

Health outcomes
Mental Health (2014)

▶ **Count Mental Health Issues**:

"In the last month, how often did you feel":

- ▶ Exhausted without any real reason?
- ▶ Nervous?
- ▶ So nervous that nothing could calm you down?
- ▶ Desperate?
- ▶ Restless or unable to stand still?
- ▶ So restless that you could not stand still?
- ▶ Sad/depressed?
- ▶ So depressed that nothing could cheer you up?
- ▶ Like everything was an effort?
- ▶ Good for nothing?

Health outcomes

Well-being (2014)

- ▶ **Life satisfaction**:

  "What feelings do you currently have about your life in general?"

  - ▶ $0 =$ very unsatisfied
  - ▶ ...
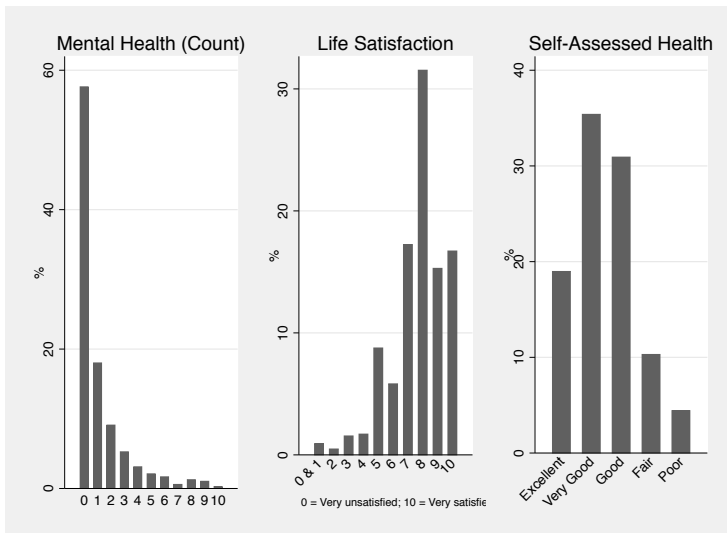 - ▶ $10 =$ very satisfied

Genral Health

- ▶ **Self-reported health (2012-2014)**:

  "Would you say your health in general is...: "

  - ▶ $1 =$ Excellent
  - ▶ $2 =$ Very good
  - ▶ $3 =$ Good
  - ▶ $4 =$ Fair
  - ▶ $5 =$ Poor

Health Distribution (50 to 75 years old)

Specifications

1. ▸ σ_η^2 : Variance of the permanent component of income.

   ▸ σ_ϵ^2 : Variance of the transitory component of income.

2. ▸ Log of average annual income between 30 and 55 years old.

3. ▸ Age (group of 5 years)

   ▸ Education (4 categories)

   ▸ Provinces (Qc, On, BC, Prairies, Atlantics)

   ▸ Marital status

   ▸ Number of children

   ▸ Born in Canada

		(1)	(2)	(3)
Mental health (count)	σ_η^2	14.4622	10.5400	10.4394
		(9.814)	(9.679)	(9.687)
	σ_ϵ^2	2.6089***	1.7509***	1.4929***
		(0.467)	(0.469)	(0.472)
	ln(Income)		-0.5444***	-0.4407***
			(0.055)	(0.064)
	N	3267	3267	3267
Life satisfaction	σ_η^2	-14.6915	-10.9442	-5.7971
		(10.005)	(9.889)	(9.715)
	σ_ϵ^2	-3.1075***	-2.2895***	-1.5791***
		(0.477)	(0.515)	(0.475)
	ln(Income)		0.5142***	0.3754***
			(0.056)	(0.064)
	N	3254	3254	3254
Covariates	Demographic	No	No	Yes

		(1)	(2)	(3)
Self-assessed health	σ_η^2			
	Excellent	-0.8606	-0.3854	-0.4803
		(1.387)	(1.348)	(1.307)
	Very good	-0.4319	-0.1924	-0.2396
		(0.696)	(0.673)	(0.652)
	Good	0.5468	0.2455	0.3058
		(0.881)	(0.859)	(0.832)
	Fair	0.4694	0.2114	0.2644
		(0.757)	(0.740)	(0.720)
	Poor	0.2763	0.1209	0.1496
		(0.446)	(0.423)	(0.407)
	σ_ϵ^2			
	Excellent	-0.3048***	-0.1213*	-0.1149*
		(0.064)	(0.064)	(0.063)
	Very good	-0.1530***	-0.0605*	-0.0573 *
		(0.033)	(0.032)	(0.032)
	Good	0.1936***	0.0773*	0.0731*
		(0.041)	(0.041)	(0.040)
	Fair	0.1662***	0.0665*	0.0633*
		(0.035)	(0.035)	(0.035)
	Poor	0.0979***	0.0381*	0.0358*
		(0.022)	(0.020)	(0.020)
ln(Income)				
	Excellent		0.1107***	0.0694***
			(0.007)	(0.008)
	Very good		0.0553***	0.0346***
			(0.004)	(0.004)
	Good		-0.0705***	-0.0442***
			(0.005)	(0.005)
	Fair		-0.0607***	-0.0382***
			(0.004)	(0.005)
	Poor		-0.0347***	-0.0216***
			(0.003)	(0.003)
	N	6920	6920	6920
Covariates	Demographic	No	No	Yes

Robustness Specifications

1. Exclude individuals who have already reported an income less than 20% of their average income.
   - ▶ Reduce effects of outliers.
   - ▶ Periods during which individuals could have worked abroad.

2. Keep individuals who had a constant marital status between 30 and 55 years old.
   - ▶ To make sure that computed variances are not biased by such changes.

3. Keep only respondent with at least 20 observations between 30 and 55 years old.
   - ▶ $\sigma_{\eta i}$ and $\sigma_{\sigma i}$ estimated with more precision.
   - ▶ But lose all respondent over 65 years old.

4. Control for the number of relationships.
   - ▶ Individuals may have been in a relationship with different people who earned different annual incomes.

		Baseline	20% income	Mstat stability	$\geq$ 20 obs	Num. couple
Mental health (count)	σ_η^2	10.4394	17.8944	11.1681	13.0417	9.4814
		(9.687)	(15.627)	(14.334)	(12.372)	(9.691)
	σ_ϵ^2	1.4929***	2.7588***	1.6848**	1.1586**	1.4455***
		(0.472)	(0.779)	(0.762)	(0.537)	(0.473)
	ln(Income)	-0.4407***	-0.3267***	-0.4511***	-0.3808***	-0.4409***
		(0.064)	(0.073)	(0.112)	(0.077)	(0.064)
	N	3267	2727	1310	2539	3267
Life satisfaction	σ_η^2	-5.7971	19.1070	-29.3601**	-7.8012	-5.4564
		(9.715)	(15.930)	(13.896)	(12.197)	(9.723)
	σ_ϵ^2	-1.5791***	-0.8837	-2.0447***	-1.4631***	-1.5670***
		(0.475)	(0.794)	(0.738)	(0.531)	(0.475)
	ln(Income)	0.3754***	0.4091***	0.3537***	0.3154***	0.3789***
		(0.064)	(0.075)	(0.109)	(0.076)	(0.064)
	N	3254	2718	1307	2530	3253
Covariates	Demographic	Yes	Yes	Yes	Yes	Yes

		Baseline	20% income	Mstat stability	≥ 20 obs	Num. couple
Self-assessed health	σ_η^2					[t]
	Excellent	-0.4803	-2.8430	0.1761	-1.2303	-0.4327
		(1.307)	(2.255)	(1.980)	(1.792)	(1.325)
	Very good	-0.2396	-1.3850	0.0884	-0.5881	-0.2143
		(0.652)	(1.098)	(0.993)	(0.858)	(0.656)
	Good	0.3058	1.9115	-0.1109	0.8412	0.2786
		(0.832)	(1.514)	(1.246)	(1.225)	(0.853)
	Fair	0.2644	1.5506	-0.0966	0.6590	0.2363
		(0.720)	(1.232)	(1.086)	(0.961)	(0.724)
	Poor	0.1496	0.7658	-0.0571	0.3181	0.1321
		(0.407)	(0.608)	(0.641)	(0.465)	(0.404)
	σ_ϵ^2					
	Excellent	-0.1149*	-0.1316	-0.2521***	-0.0953	-0.1040
		(0.063)	(0.112)	(0.094)	(0.074)	(0.064)
	Very good	-0.0573*	-0.0641	-0.1265***	-0.0456	-0.0515
		(0.032)	(0.055)	(0.048)	(0.035)	(0.032)
	Good	0.0731*	0.0885	0.1587***	0.0652	0.0670
		(0.040)	(0.075)	(0.059)	(0.051)	(0.041)
	Fair	0.0633*	0.0718	0.1382***	0.0511	0.0568
		(0.035)	(0.061)	(0.052)	(0.040)	(0.035)
	Poor	0.0358*	0.0354	0.0816***	0.0247	0.0317
		(0.020)	(0.030)	(0.032)	(0.019)	(0.020)
	ln(Income)					
	Excellent	0.0694***	0.0727***	0.0544***	0.0674***	0.0690***
		(0.008)	(0.011)	(0.014)	(0.010)	(0.009)
	Very good	0.0346***	0.0354***	0.0273***	0.0322***	0.0342***
		(0.004)	(0.005)	(0.007)	(0.005)	(0.004)
	Good	-0.0442***	-0.0489***	-0.0342***	-0.0461***	-0.0444***
		(0.005)	(0.007)	(0.009)	(0.007)	(0.005)
	Fair	-0.0382***	-0.0397***	-0.0298***	-0.0361***	-0.0377***
		(0.005)	(0.006)	(0.008)	(0.006)	(0.005)
	Poor	-0.0216***	-0.0196***	-0.0176***	-0.0174***	-0.0211***
		(0.003)	(0.003)	(0.005)	(0.003)	(0.003)
	N	6920	5704	2833	5325	6859
Covariates	Demographic	Yes	Yes	Yes	Yes	Yes

Conclusion

▶ Governments and policy makers should settle public policies to reduce income volatility.

▶ **Futur work:**

   ▶ Estimate permanent and transitory shocks after simulating the application of different policies that can reduce income volatility:

      ▶ Increase of employment insurance.

      ▶ Different levels of guaranteed minimum income.

   ▶ Estimate the health improvement following these policies.