

Effects of Macroeconomic Fluctuations on Mental Health and Psychopharmacs Drug Consumption

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Background

- Mental health disorders represent a particularly complex challenge given their **high prevalence** and **disability burden** (*Vigo, 2019*).
- Public health officials have raised concerns that **recession on this scale**, and its economic consequences of unemployment, debt and losses of income, have **potential health consequences** (*WHO-Europe, 2009*).
- In Spain, *antidepressant sales* **increased** by 10 % between 2009 and 2012 and, for the *sales of anxiety drugs* experience an **increase** from 3.6 % in 2009 to 4.5 % in 2010 (*Gili et al., 2014*).
- The net population impact of business cycles on depression symptoms remains **speculative** (*Goldman-Mellor et al., 2010*). Focusing on Spain:
 - **increase** in the prevalence of poor mental health among Spanish men (*Bartoll et al., 2014*).
 - long-term unemployment has a **negative effect** on both **self-assessed** and **mental health**, and these effects are worse during the economic crises (*Urbanos-Garrido et al., 2015*).
- **Mixed empirical evidence from other settings** about the effect of economic downturns on the mental health conditions.

Background

- The literature on the impacts of business cycle fluctuations on psychotropic drugs consumption is **scarce** and **inconclusive**.
 - **increase** in the *consumption of psychotropic drugs* in the period following the economic crisis, using Catalan data (*Barcelo et al., 2016*).
 - **strong increase** in the consumption of *marijuana* and *cocaine* (*Martin-Bassols et al., 2016*).
 - *Arroyo (2016)* finds a **non-significant effect** of the recent financial crisis on the *consumption of psychotropic drugs*.

Motivation

- Identify empirically the various **causal pathways** which link **economic shocks** to **changes in mental health**.
- Analyze if changes in mental health caused by business cycle conditions may lead to experience changes in the **consumption of psychotropic drugs** since they are used to mitigate the effects of these mental health disorders.
- Contribute to the growing body of literature focusing on the **temporal**, as well as, the **local evolution of the economic cycle** in order to isolate causal effects.

Aim of the paper

To explore the effect of **very strong economic fluctuations** on the **mental health status** of the population, as well as, on their **consumption of psychotropic drugs** in a Spanish region, Catalonia.

Mechanisms through which economic crises affect health

According to the **human capital model of health investment**, if individuals experience an **economic shock**:

- 1 we expect that the **disposable income drops** and **living conditions** may deteriorate leading to the enlargement of **mental health problems**.

⇒ Even those individuals that manage to keep their jobs may suffer from **increased levels of stress** that is known to influence health by affecting **habits** such as smoking, drinking, eating and so on (*Brannon and Feist, 1997*).
- 2 However, some analysts suggest that there may be **counter-intuitive health benefits** during hard economic times, as people may use their free time to **practice more exercises** or to do **some other health enhancing activity** (*Ruhm 2000, 2003, 2006*).

- Dataset used was the years 2010-2015 of the **Catalan Health survey (ESCA)**, which is a **cross-sectional** population-based face-to-face *survey* and it is collected *twice per year*.
- We focus on a region, Catalonia, of a country, Spain, which experiences a *deep economic recession* in the late 2000's. [▶ Figure](#)
- Individuals aged *over 15 years* have been analyzed.
- Representative sample of **26,849 interviewee**.
- Highly individualised information related to: (i) *personal characteristics*, such as professional status and region of residence; (ii) *health status* and *health behaviors*: and (iii) the *psychotropic drug consumption*.

Outcome Variables

Three main groups of dependent variables:

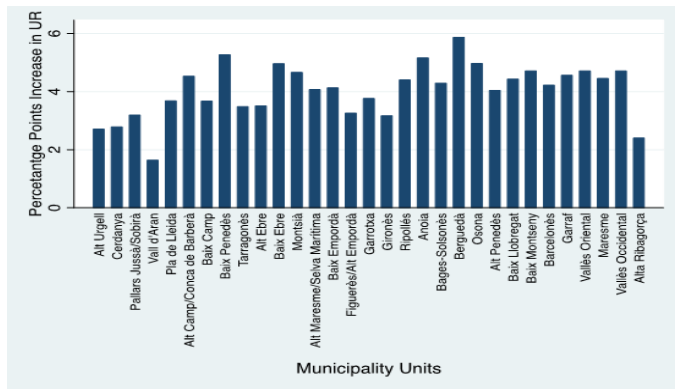
- **Consumption of psychotropic drugs:** measured as consumption of (1) **anxiolytics** and consumption of (2) **antidepressants**.
 - 1 **Anxiolytics drugs** are defined as **sleeping drugs**, which is a substance aimed to calming anxiety and agitation without demising the level of conscious. We exclude tranquilizers because the incidence of its consumption is close to zero.
 - 2 **Antidepressants** are defined as all drugs that are used to treat depression.
- ⇒ All outcome variables are **binary** that take the numeric value 1 if an individual has consumed drugs and 0 otherwise.

- **Mental health status:** two main variables are the (1) **risk of having poor mental health** and the (2) **self-reported mental health status**.
 - ① **Risk of having poor mental health using a Mental Health Index (GHQ-12)** that takes values 1 for individuals whose score is defined to be at risk of poor mental health, and takes values 0 for individuals with normal mental health evaluation.
 - ② **Self-reported mental health status** that takes value 1 if individuals respond either to one of the mental disorders (depression and anxiety) or both of them.
 - ③ **Chronic illness** defined as a dummy variable that takes value 1 if the individual claims that she/he had a chronic illness and 0 otherwise.
 - ④ **Self-assessed health (SAH)** captures general health status, which takes value 1 if individual reports one of the following health status: excellent, very good, or good, and takes 0 if the individuals reports a regular or bad health status.

- **Health behaviors:** include a dummy variables for **enough sleep** (more than 6 hours per day), for a **currently smokers**, and whether individual practice any **physical activity**.

Study Design

- Our **variable of interest** is the **Unemployment Rate (UR)** at the local level:



- UR data collected from the *Catalan Institute of Statistics*, which is **linked** with each individual in the survey according to the municipal unit where he/she lives and the trimester-year in which he/she answers the questionnaire.
- The broad time horizon of the data ensures an **unequal variation in business cycle conditions across 31 municipality units**.

Model Specification

We estimate a **fixed effects logistic regression model**:

$$Y_{itm} = \alpha + \beta UnemploymentRate_{tm} + \delta X_{itm} + \gamma M_m + \theta T_t \quad (1)$$

| | Meaning |
|-----------|--|
| Y_{itm} | Binary variable for 3 dependent variables for each individual "i" in each period "t" living in municipality "m". |
| UR_{tm} | Unemployment Rate for each period "t" and municipality "m". |
| X_{itm} | individual control variables: age group dummies, gender and professional status. |
| M_m | Fixed Effects (FE) for each of the municipal unit. |
| T_t | Fixed Effects (FE) for each trimester-year. |

- We estimate *Equation (1)* for each outcome variables separately, *with* and *without* explanatory variables, and using *robust standard errors*.
- β_2 is the estimate of interest.
- We report **Average Marginal Effects (AMEs)** results.
- We also estimate the same *Equation (1)* for different sub-samples by **age groups** and **gender** in order to capture *heterogeneous impacts*.

1. Psychopharmac consumption

| | Antidepressant | Antidepressant | Sleeping pills | Sleeping pills |
|---------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Unemployment | -0.002 | -0.001 | -0.001 | -0.002 |
| Rate | (0.004) | (0.004) | (0.003) | (0.004) |
| FE Regional unit | x | x | x | x |
| FE Year | x | x | x | x |
| Individual Controls | | x | | x |
| Observations | 27,316 | 23,325 | 27,316 | 23,325 |

¹ Robust standard errors are in parentheses. Significance levels: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

² Results are from a logistic model and marginal effects are reported. Individual controls include age group dummies, gender dummy and professional status dummies. See Table 1A in the appendix for more detailed on the variables included as individual controls. Standard errors are clustered at the municipal unit level. Source: ESCA survey waves 2010–2015, UR source: Catalan Institute of Statistics (IDESCAT).

2. Mental health and health status

| | Depression | Depression | Risk of poor Mental Health | Risk of poor Mental Health | Chronic illness | Chronic illness | SAH | SAH |
|----------------------|-------------------|-------------------|-------------------------------|-------------------------------|--------------------|--------------------|-------------------|------------------|
| Unemployment Rate | -0.008 (0.006) | -0.010 (0.013) | -0.007 (0.009) | -0.011 (0.007) | 0.006 (0.009) | 0.004 (0.009) | -0.001 (0.005) | 0.008 (0.006) |
| FE Regional unit | x | x | x | x | x | x | x | x |
| FE Year | x | x | x | x | x | x | x | x |
| Individual Controls | | x | | x | | x | | x |
| Observations | 27,315 | 23,324 | 27,316 | 23,324 | 27,315 | 23,324 | 27,315 | 23,324 |

¹ Robust standard errors are in parentheses. Significance levels: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

² Results are from a logistic model and marginal effects are reported. Individual controls include age group dummies, gender dummy and professional status dummies. See Table 1A in the appendix for more detailed on the variables included as individual controls. Standard errors are clustered at the municipal unit level. Source: ESCA survey waves 2010–2015, UR source: Catalan Institute of Statistics (IDESCAT).

3. Individual health behaviors

| | Physical Activity | Physical Activity | Smoking | Smoking | Hours' Sleep | Hours' Sleep |
|---------------------|-------------------|-------------------|------------------|------------------|-------------------|---------------------|
| Unemployment Rate | 0.007 (0.012) | 0.008 (0.007) | 0.001 (0.006) | 0.003 (0.007) | -0.007 (0.006) | -0.011** (0.009) |
| FE Regional unit | x | x | x | x | x | x |
| FE Year | x | x | x | x | x | x |
| Individual Controls | | x | | x | | x |
| Observations | 27,295 | 23,311 | 27,316 | 23,325 | 17,500 | 13,776 |

¹ Robust standard errors are in parentheses. Significance levels: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

² Results are from a logistic model and marginal effects are reported. Individual controls include age group dummies, gender dummy and professional status dummies. See Table 1A in the appendix for more detailed on the variables included as individual controls. Standard errors are clustered at the municipal unit level. Source: ESCA survey waves 2010–2015, UR source: Catalan Institute of Statistics (IDESCAT).

⇒ When the **local economy deteriorates** (*i.e. the local unemployment rate increase in 10 percentage points*) the probability of sleeping more than 6 hours **decreases** (*by 1.1 percentage points*).

HETEROGENEOUS RESULTS

1. Psychotropic drugs consumption:

| | Female subsample | Male subsample | Aged 20-35 subsample | Aged 35-50 subsample | Aged 50-65 subsample | Aged 65-80 subsample | Aged 80+ subsample |
|--|-------------------|-------------------|----------------------|----------------------|----------------------|----------------------|--------------------|
| Probability of Consumption Antidepressant drugs | | | | | | | |
| Unemployment Rate | -0.003 (0.007) | -0.001 (0.004) | -0.013** (0.005) | 0.006 (0.014) | 0.001 (0.009) | -0.024 (0.019) | 0.022 (0.019) |
| Probability of Consumption Sleeping Pills | | | | | | | |
| Unemployment Rate | -0.002 (0.007) | -0.003 (0.008) | -0.014*** (0.005) | 0.008* (0.005) | -0.001 (0.015) | 0.002 (0.018) | -0.017 (0.026) |
| Observations | 11,428 | 11,897 | 3,818 | 4,926 | 4,247 | 2,517 | 1,591 |

¹ Robust standard errors are in parentheses. Significance levels: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

² Results are from a logit model and marginal effects are reported. Fixed effects for regional unit and time controlled. Individual controls include age group dummies, gender dummy and professional status dummies. See Table 1A in the appendix for more detailed on the variables included as individual controls. Standard errors are clustered at the municipal unit level. Source: ESCA survey waves 2010–2015, UR source: Catalan Institute of Statistics (IDESCAT).

Heterogeneous Results

2. Mental, physical and self-assessed health measures:

| | Female subsample | Male subsample | Aged 20-35 subsample | Aged 35-50 subsample | Aged 50-65 subsample | Aged 65-80 subsample | Aged 80+ subsample |
|---|------------------|----------------|----------------------|----------------------|----------------------|----------------------|--------------------|
| Probability of suffering chronic illness | | | | | | | |
| Unemployment | 0.002 | 0.007 | -0.013 | 0.029 | 0.009 | -0.011 | -0.016 |
| Rate | (0.009) | (0.012) | (0.027) | (0.020) | (0.011) | (0.008) | (0.019) |
| Obs | 11,427 | 11,897 | 4,130 | 5,029 | 4,247 | 1,953 | 1,619 |
| Probability of reporting a good self-assessed health | | | | | | | |
| Unemployment | 0.006 | 0.010 | 0.034** | 0.004 | 0.002 | 0.017 | -0.015 |
| Rate | (0.007) | (0.009) | (0.014) | (0.021) | (0.016) | (0.027) | (0.026) |
| Obs | 11,427 | 11,897 | 4,008 | 5,029 | 4,246 | 2,517 | 1,619 |
| Probability of suffering depression/anxiety | | | | | | | |
| Unemployment | -0.007 | -0.015* | -0.016 | -0.002 | -0.006 | -0.028 | -0.017 |
| Rate | (0.012) | (0.008) | (0.013) | (0.012) | (0.018) | (0.029) | (0.023) |
| Obs | 11,427 | 11,897 | 4,130 | 5,029 | 4,247 | 2,517 | 1,591 |
| Probability of risk of poor Mental Health using GHQ-12 index | | | | | | | |
| Unemployment | -0.014 | -0.010 | -0.011 | -0.006 | -0.015 | -0.008 | -0.038* |
| Rate | (0.008) | (0.008) | (0.012) | (0.018) | (0.014) | (0.022) | (0.023) |
| Observations | 11,428 | 11,897 | 4,074 | 5,029 | 4,247 | 4,247 | 1,481 |

¹ Robust standard errors are in parentheses. Significance levels: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

² Results are from a logit model and marginal effects are reported. Fixed effects for regional unit and time controlled. Individual controls include age group dummies, gender dummy and professional status dummies. See Table 1A in the appendix for more detailed on the variables included as individual controls. Standard errors are clustered at the municipal unit level. Source: ESCA survey waves 2010–2015, UR source: Catalan Institute of Statistics (IDESCAT).

Heterogeneous Results

3. Individual health behaviour measures:

| | Female subsample | Male subsample | Aged 20-35 subsample | Aged 35-50 subsample | Aged 50-65 subsample | Aged 65-80 subsample | Aged 80+ subsample |
|--|------------------|----------------|----------------------|----------------------|----------------------|----------------------|--------------------|
| Probability of sleep more than 6 hours | | | | | | | |
| Unemployment | -0.004 | -0.018* | 0.006 | -0.012 | -0.025 | -0.042 | 0.008 |
| Rate | (0.012) | (0.011) | (0.012) | (0.010) | (0.024) | (0.046) | (0.039) |
| Obs | 6,769 | 7,007 | 2,180 | 3,012 | 2,456 | 1,339 | 896 |
| Probability of practice physical activity | | | | | | | |
| Unemployment | 0.010 | 0.006 | -0.003 | 0.001 | 0.026** | 0.024 | 0.004 |
| Rate | (0.010) | (0.009) | (0.018) | (0.013) | (0.012) | (0.022) | (0.036) |
| Obs | 11,420 | 11,891 | 4,129 | 5,028 | 4,243 | 2,512 | 1,617 |
| Probability of smoking | | | | | | | |
| Unemployment | 0.003 | 0.001 | 0.002 | -0.003 | 0.009 | 0.034** | 0.002 |
| Rate | (0.009) | (0.011) | (0.021) | (0.012) | (0.018) | (0.014) | (0.013) |
| Observations | 11,428 | 11,897 | 4,131 | 5,029 | 4,247 | 2,470 | 1,219 |

¹ Robust standard errors are in parentheses. Significance levels: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

² Results are from a logit model and marginal effects are reported. Fixed effects for regional unit and time controlled. Individual controls include age group dummies, gender dummy and professional status dummies. See Table 1A in the appendix for more detailed on the variables included as individual controls. Standard errors are clustered at the municipal unit level. Source: ESCA survey waves 2010–2015, UR source: Catalan Institute of Statistics (IDESCAT).

Discussion

The main findings show that:

- **Local changes in the economic situation** during the studied period 2010-2015 are not significantly associated with **changes in the risk of using psychotropic drugs** nor in the **mental health status**.
 - The local business cycle conditions have **consequences on mental health** depending on the **gender** and **age group**:
 - ① Deterioration in the local labour market conditions are associated with a **lower likelihood of consuming psychotropic drugs** for individuals aged **20 to 35 years old**.
 - ② For this group of individuals, we show that **increases** in the **probability of reporting good self-assessed health**.
 - ③ We find that **men** have a **lower incidence of depression or anxiety** when local labour market conditions deteriorate.
- ⇒ We are able to shed light on the **underlying mechanism** that governs the relation between **deterioration of the local labour market conditions** and **mental health** and **psychotropic consumption**.

THANKS FOR YOUR ATTENTION

QUESTIONS?

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Evolution of the unemployment rate in Catalonia and Spain by trimester during our sample period.

