



# Macroeconomic conditions and health: Inspecting the transmission mechanism



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## ABSTRACT

We study the relationship between macroeconomic conditions and self-reported health in a large sample of Italian individuals, focusing on the mediating role played by health behaviors (smoking, alcohol consumption, physical activity, eating habits) and economic stress. Our findings indicate that, overall, higher local unemployment is negatively related to individuals' health conditions. A one percentage point increase in the province-level unemployment rate is associated with a significant increase in the probability of experiencing diabetes (0.03 percentage points), infarction (0.01), ulcer (0.06), cirrhosis (0.01) and nervous disorders (0.07), with a time lag that differs across individual health conditions. Employment status and educational level play a significant role as moderators of these relationships. Eating habits, in addition to economic stress, play a key role as mediators, by enhancing the negative relationship between macroeconomic conditions and health outcomes, while physical exercise is found to play a dampening role.

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## 1. Introduction

The growing concerns about the pervasiveness and persistence of joblessness in advanced economies, and particularly in Europe, are fueled by the perception that the social costs of unemployment are far greater than the economic costs, as measured by lower income levels. The World Health Organization (WHO) has forcefully warned policymakers against the adverse health consequences of the recent global financial crisis (WHO, 2009, 2011). However, despite the existence of abundant evidence documenting the effects of macroeconomic conditions on health, relatively little is known about the underlying transmission mechanism.

At the theoretical level, macroeconomic fluctuations can affect health outcomes in several ways. Health can be negatively affected by production externalities, such as increased air pollution and car accidents (Davis et al., 2010; Ruhm, 2000), or by reduced quality and availability of health care (Stevens et al., 2015). Macroeconomic conditions can also affect health outcomes by generating

stressors, that can be either psychosocial (e.g., time pressure, uncertainty, job insecurity) or physical (e.g., heavy work-shifts).<sup>1</sup> The exposure to such stressors generates economic stress (Catalano and Dooley, 1983) which, in turn, may determine either physiological (e.g., infarction, angina) or psychological negative health outcomes (e.g., anxiety, nervous disorders).

Macroeconomic conditions can also indirectly affect health outcomes through health behaviors, by modifying both disposable income and the opportunity cost of time. For example, when the unemployment rate rises, individuals experience a reduction (or expected reduction) in disposable income that could result in lower consumption of alcohol and cigarettes, but also of healthy food and physical exercise. On the other hand, individuals facing a lower opportunity cost of leisure can spend more time in health-improving activities, such as physical exercise, producing and consuming healthy meals, or recreational activities and interpersonal relationships (Ruhm, 2000). In addition, health behaviors such as smoking or alcohol consumption may also change as a

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<sup>1</sup> We refer mainly to the University of Michigan job stress model (Israel et al., 1996) and Karasek's model (Karasek and Theorell, 1990; Karasek et al., 1998).

coping strategy against economic stress. Overall, it is difficult to determine *a priori* which of these effects prevails.

In this paper, we empirically investigate the transmission mechanism linking macroeconomic conditions to individual-level health outcomes, focusing on the mediating role played by health behaviors and economic stress. We contribute to the existing literature, that generally focuses on the relationship between macroeconomic conditions and *either* health behaviors *or* health outcomes (e.g., Charles and DeCicca, 2008; Ruhm, 2000; Tekin et al., 2013), by disentangling the direct link between macroeconomic conditions and health outcomes from the indirect links explained by health behaviors and economic stress. In addition, while most existing studies focus on the static relationship between macroeconomic conditions and health,<sup>2</sup> we explicitly allow for the fact that changes in macroeconomic conditions may affect health outcomes over time.

Our analysis exploits detailed information about the health behaviors and health conditions of Italian individuals from the *Multipurpose Survey on Households* (ISTAT, 2015), and data on local labor market conditions at province level, with an identification strategy based on the variation over time and across provinces in local unemployment and individual health. Our findings indicate that local unemployment is negatively related to health outcomes, with a time lag that differs across health conditions. Eating habits, in addition to economic stress, are identified as key mediators contributing to the negative relationship between macroeconomic conditions and health outcomes, while physical exercise is found to play an opposite (dampening) mediating role. The paper is structured as follows. Section 2 discusses the related literature. Sections 3 and 4 describe the data and methods, respectively. Section 5 presents the results. Section 6 concludes.

## 2. Related literature

Following the seminal work by Ruhm (2000), a wide body of literature has documented the effects of macroeconomic fluctuations on health, showing that weakening economies are associated with changes not only in mortality (e.g., Edwards, 2008) and cause-specific mortality (e.g., Svensson, 2007), but also in morbidity (Ólafsdóttir et al., 2016) and health behaviors (e.g., Ásgeirsdóttir et al., 2014a,b), such as smoking (Ruhm, 2005), alcohol consumption (Ruhm and Black, 2002; Dee, 2001; Cotti et al., 2015), physical exercise and eating habits (Colman and Dave, 2013; Dave and Kelly, 2012). While a number of studies have found a pro-cyclical pattern of mortality and morbidity (e.g., Gerdtham and Ruhm, 2006; Miller et al., 2009; Gonzalez and Quast, 2011; Haaland and Telle, 2015), other studies have found either counter-cyclical or a-cyclical patterns (e.g., Svensson, 2007; Buchmueller et al., 2007; Charles and DeCicca, 2008; Stuckler et al., 2009; Toffolutti and Suhrcke, 2014).

The heterogeneity of the findings in this literature is explained by a number of factors. First, the cyclical pattern of health outcomes differs by age group, gender and type of health condition (e.g., mental vs. physical health), and the empirical results are generally sensitive to the specific indicator used to measure economic conditions (Stevens et al., 2015; Tekin et al., 2013). Second, several contextual factors that differ systematically across countries, such as aggregate income, active labor market policies, and social safety nets or social support networks serving as formal or informal insurance mechanisms (Ferreira and Schady, 2009; Suhrcke and Stuckler, 2012), may affect the results. Third, the health consequences of macroeconomic conditions may be

different during normal business-cycle fluctuations or major crises (Suhrcke and Stuckler, 2012).

In the medical literature, the most significant health problems identified as directly related to stress are cardiovascular diseases (Belkic et al., 2004; Kivimäki et al., 2006), nervous and mental disorders (Bonde, 2007; Netterstrom et al., 2008), diabetes (Heraclides et al., 2012) and ulcer (Mayer, 2000). It is also widely documented that risky health behaviors affect health outcomes. Lack of regular physical exercise increases the risk of several chronic conditions, including coronary and heart diseases (Warburton et al., 2010) and type 2 diabetes (Miller and Dunstan, 2004). Smoking increases substantially the risk of coronary and heart diseases, as well as cancer and respiratory conditions (US Department of Health and Human Services, 2014). Alcohol consumption is related to – among others – cirrhosis, diabetes, heart diseases and mental conditions (Rehm et al., 2009). Bad eating habits increase the risk of several chronic health conditions, as widely documented by the World Health Organization (WHO, 2003).

In the literature, however, there is still much debate about how health behaviors adjust to changes in macroeconomic conditions over time and how, through this mechanism, they affect health outcomes.<sup>3</sup> Empirical studies find conflicting results on these issues. Ruhm (2005) shows that health behaviors, such as smoking, may respond differently in the short- and the medium-term, and that changes in behavior can occur with a delay, following an initial period where they remain unaffected. Ásgeirsdóttir et al. (2014a,b) find, instead, that most health behaviors underwent only temporary deviations and reverted back to pre-crisis levels in the recovery from the financial crisis in Iceland.

Against this background, our empirical analysis investigates both general health outcomes (satisfaction with health and indicators of hospitalization) and specific health conditions, focusing on diabetes, hypertension, infarction, angina, ulcer, cirrhosis, and nervous disorders. Regarding the transmission mechanism, we examine the role played by economic stress and health behaviors commonly identified by the literature, focusing on smoking, alcohol consumption, physical inactivity, and eating habits.

## 3. Data

Our analysis relies on two different data sets from the Italian Statistical Office (ISTAT), covering 103 Italian provinces on a yearly basis between 1993 and 2012. Individual-level data on health conditions and socio-demographic characteristics are from the *Multipurpose Survey on Households* (ISTAT, 2015), a repeated survey carried out annually through face-to-face interviews on a different sample of about 50,000 individuals. The sample is designed to be representative of the Italian population at province (NUTS-3) level.<sup>4</sup> The data set contains detailed information about social behaviors, perceptions and time use in everyday life, in addition to individual and household-level characteristics. Province-level data on labor market conditions (unemployment rate) are from ISTAT *Territorial Economic Accounts*.

<sup>3</sup> Smoking, for example, can be viewed as a short run coping response to stress with long-term negative health effects (Suhrcke and Stuckler, 2012).

<sup>4</sup> The Nomenclature of Territorial Units for Statistics (NUTS) classification is a hierarchical system used by Eurostat for dividing up the economic territory of the European Union. For Italy, NUTS codes classify territories into geographical areas (NUTS-1), regions (NUTS-2) and provinces (NUTS-3). See EUROSTAT for details.

<sup>2</sup> Notable exceptions are Ruhm (2003, 2005), Stuckler et al. (2011), and Classen and Dunn (2012).

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