Macroeconomic changes and mortality in Mexico

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Abstract While previous studies examine how the business cycle affects mortality in developed countries, less is known about this relationship in developing countries. In this paper, we investigate whether the procyclical nature of mortality in developed countries found by Ruhm (Q J Econ 115(2):617–650, 2000) and others is also present in Mexico. We assemble a unique panel data set that contains state-level data on mortality rates by age and cause of death, GDP per capita, and socioeconomic status. We find that for Mexico total mortality rates are procyclical, with the largest impact on those aged 20–49. While these findings are similar to those in Ruhm (Q J Econ 115(2):617–650, 2000), the effects of business cycles on mortality rates differ for several specific causes of death. These results suggest that whereas total mortality may be procyclical in both developed and developing countries, significant differences may exist for some causes of death.

Keywords Business cycles · Mortality rates · Developing countries · Mexico

JEL Classification C33 · E32 · I1

1 Introduction

In his seminal paper, Ruhm (2000) analyzes the relationship between business cycles and mortality in the U.S. Using state-level data from 1972 to 1991, he finds that
upturns in state economic activity are associated with increases in total mortality.\(^1\)

The finding that mortality rates are procyclical was suggested by earlier works for the U.S. and the U.K. (Ogburn and Thomas 1922; Thomas 1927) and the U.S. (Eyer 1977), among others. In more recent papers, this procyclical relationship has been confirmed for longer periods in the U.S. (Tapia Granados 2005a), and in studies of Germany (Neumayer 2004), Spain (Tapia Granados 2005b), a group of five European countries (McAvinchey 1988), and for 23 developed countries within the Organization for Economic Cooperation and Development (OECD) (Gerdtham and Ruhm 2006).\(^2\)

However, whereas the aforementioned studies investigate rich countries, less is known regarding the relationship between mortality and business cycles in developing countries. Studies for middle and middle-high income countries report a wide range of results from procyclical (Abdala et al. 2000; Khang et al. 2005), to procyclical and inconclusive (Rios-Neto and Carvalho 1997; Ortega-Osuna and Reher 1997; Bravo 1997), to inconclusive (Palloni and Hill 1997), and to countercyclical (Lee 1997; Cutler et al. 2002). Most of these studies employ national data and a time series methodology that may be prone to omitted variable bias (see Ruhm 2000). While Cutler et al. (2002) and Abdala et al. (2000) use a panel approach, they do not use annual data.

The purpose of this paper is to investigate whether the procyclical nature of mortality in developed countries found by Ruhm (2000) and others is present in Mexico, a developing economy with one-fourth of the U.S. per capita income. Our results are obviously specific to Mexico. However, Mexico and other middle and middle-high income countries share similar levels of GDP per capita, private and public health spending as a fraction of GDP, and population age distribution. Further, these countries are currently experiencing an epidemiological transition away from infectious diseases.

We assemble a unique data set of state-level annual data for each of the 32 states in Mexico from 1993 through 2004. The data contain the mortality rate (total, by age group, and for several specific causes of death), measures of economic activity, and relevant control variables. While such state-level data can often be easily obtained for developed countries, they are typically not available for developing countries. The disaggregated nature of these data and the substantial time period they cover allow us to improve upon the previous literature by estimating panel level regressions that include year and state fixed effects.

We obtain three main results. First, total mortality rates increase (decrease) during economic expansions (contractions) for Mexico during this time period. This finding suggests that total mortality may be procyclical for some developing countries. Second, we find a larger effect of business cycles on the mortality rate for those aged 20–49 than on older cohorts. Third, while our first two results are similar to those for the U.S. in Ruhm (2000), interesting differences emerge in the analysis of specific

\(^1\) Ruhm (2000) also uses individual-level data to determine the channels through which business cycles may affect mortality in the U.S. As individual-level data are not available for Mexico, we focus only on the analysis of state-level data.

\(^2\) Gerdtham and Ruhm (2006) analysis excludes developing countries in the OECD such as Mexico and Turkey.