Business cycles and health: Lessons from the Icelandic economic collapse

Tinna Laufey Ásgeirsdóttir
Faculty of Economics, University of Iceland
ta@hi.is

The literature on the relationship between business cycles and health dates back to the 1920s, when researchers found that economic expansions were associated with increases in mortality rates in the United States and the United Kingdom (Ogburn and Thomas 1922; Thomas 1927). Over the next few decades, not much of substance was added to the literature. However, in a series of articles, Brenner (1971, 1973a, 1973b, 1975), found the opposite, where he suggested that mortality was positively associated with bad economic times. However, Brenner's results were somewhat of an anomality in the literature and shortly after his series of publications, Eyer (1977) published his findings that were in accordance with what had been previously found by Ogburn and Thomas in the 1920s; that is increased mortality in economic upswings. In the following years Brenner's statistical methods were widely criticized, and his results could not be replicated (Marshall and Funch 1979; Gravelle et al. 1981; Stern 1983; Wagstaff 1985). It can thus be safely said that by the late 1980´s the general conclusion from the literature was that mortality rates were procyclical. The literature on business cycles and health got renewed impetus when Ruhm (2000) published an article confirming that general finding; that all-cause mortality increases in good economic times. Since then many studies on the subject have followed and nothing short of an explosion in publications occurred after the Great Recession hit. As is likely to happen with an increased amount of publications, nuances in the previously painted general picture of procyclical mortality started to emerge. Many findings have been in line with those of Ruhm's and the previous literature (Gerdtham and Ruhm 2006; Tapia Granados and Ionides 2017; Tapia Granados 2005; Ariizumi and Schirle 2012; van den Berg et al. 2017). However, conflicting results have also been found, i.e. that better health is associated with good economic conditions (Economou et al. 2008; Gerdtham

and Johannesson 2005; Svensson 2007, 2010). The reason for those differences in results is not clear, but context appears to matter and some general patterns are starting to emerge. It is clear that this is not a literature that will be resolved with a single blow in one publication. This is more like a pointillistic picture being painted, with each new study representing a new dot. Slowly, but surely a full and thorough picture is emerging. With The Great Recession, new opportunities for this line of research have arisen and the literature has moved to increased usage of individual-level data that allows for substantially increased nicety, providing much greater detail across multiple dimensions. The research that had previously focused on the relationship between business cycles on one hand and mortality, morbidity and health behaviors on the other hand, started to branch into many different sub-areas, such as research that went much further to advance understanding of the reasons for any found effects. During this continual build up of results, it is worthwhile to regularly stop and look over strands of the literature to evaluate the overarching messages that are surfacing. Maybe the greatest contribution within this literature in recent years has been in the detailed understanding that we are getting on variations in effects across health outcomes measured, be it different disease categories, mortality vs morbidity or health behaviors. This pattern started emerging early, where cause-specific mortality rates were examined, and differences across outcomes may at this time be the most notable contribution to the more nuanced picture that is developing. It is becoming clear that some health-compromising conditions or diagnoses are procyclical and others countercyclical. To provide one example, with some loss of detail, it can be said that physical health is in general found to be better in bad economic times, but psychological health is generally found to be better in good economic times (Ruhm 2000). Furthermore, differences in found effects across social and institutional contexts have been studied. This includes explorations of the importance that the strength and type of the welfare system plays in mitigating effects (Stuckler et al. 2009), as well as the level of development across the countries being examined or the related pattern of differences over time, possibly due to the changing level of

development over time (Ruhm 2015). With regard to possible policies that may be of importance over the business cycle, austerity measures have gotten some attention in the literature as a possible factor that may influence the size of health effects (Rajmil et al. 2018). In this chapter l will summarize the need for an investigation of a new and different dimension that should be taken into account, but has been lacking in the international literature described above. This is in my mind one of the main lessons from the literature on the Icelandic economic collapse of 2008 and health and will be illustrated with two examples.

The Icelandic economic collapse can almost be pinpointed to a specific date; October 6th 2008 when the Prime Minister of Iceland announced the risk of national bankruptcy in a seminal and quite frankly rather dramatic address to the nation (The Prime Minister's Office 2008). Icelanders had previously seen themselves as one of the richest nations on earth, but were now told they were facing the possibility of national bankruptcy. This rapid change in circumstances, with a clear before and after picture provided a favorable treatment that researchers have taken advantage of, for example by examining the health and health-related effects of this change (see for example Asgeirsdottir et al. 2013; Asgeirsdottir et al. 2014a; Asgeirsdottir et al. 2014b; Asgeirsdottir et al. 2016; Olafsdottir et al. 2014; Hauksdottir et al. 2013; McClure et al. 2012; G. R. Gudjonsdottir et al. 2012; Eiriksdottir et al. 2015; Eiriksdottir et al. 2013; Birgisdottir et al. 2017; Asgeirsdottir and Ragnarsdottir 2014; Jonsdottir and Asgeirsdottir 2014; Olafsdottir and Asgeirsdottir 2015). As the previous international literature contained multiple methodological challenges related to examinations of effects over long time periods where trends and multiple confounding factors can play roles that may be difficult to account for, the sharp treatment effect in Iceland appeared to provide as clean a “laboratory” as one can get in this literature. Furthermore, as Iceland generally has good health data available from both surveys and national registers, this lab was not just clean. It was also quite well stocked.

For the above-mentioned reasons, researchers examining the case of Iceland had somewhat high hopes of contributions to the international literature. And in many ways they were right to keep their hopes high. It is probably the case that the research that has since emerged based on the Icelandic collapse may have considerable internal validity and it has been well received. However, there are also important indications that external validity may be limited, and those indications should not be ignored. It may even be that the lack of external validity provides one of the main overall lessons from this literature. What we may be learning from the current literature on the health effects of the Icelandic economic collapse, is that results appear to be largely driven by contextual factors, but not the contextual factors that have been of interest in the literature so far, such as the nature of the welfare system or the level of austerity. It appears that the nature of the economic shock that occurred in Iceland played a significant role. Until now, the international literature on business cycles and health hasn´t put much focus on the details of the aggregate changes, and the necessity to do so may be quite timely. The literature on business cycles and health has been led by microeconomists and specialists within health sciences. This has resulted in detailed analyses along many aspects, but strangely the exposure itself, the business cycle, is not one of them. Weather this is due to the fact that specialists in the exposure, macroeconomists, have been largely absent from this literature could be hypothesized. For example, considerable care and though has been put into the appropriate selection and modeling of the health outcomes studied. Similarly, the individual-level pathways hypothesized, such as labor-market mechanisms, have been treated with appropriate care. Those are aspects of the causal chain that the authors contributing to this literature up until now have expertise in.

Nevertheless, in such a large and detailed literature it is quite remarkable that such an important part of the relationship, the exposure itself, has been treated without much thought and care. It should be obvious, that not all economic fluctuations are alike. However, details of how results might vary according to the nature of the changes in the macro economy are largely unexplored, with economic

conditions generally modelled in a very simple way using GDP or unemployment rates in most cases, or with time in cases where one swift change is being explored as has often been the case in the literature on the Icelandic collapse. However, aggregate economic conditions do obviously vary. Conditions can be characterized by debt crises, financial crises, hits to the real economy, currency crises, and many more peculiarities that affect peoples lives very differently. Multiple characteristics of economic fluctuations can thus play an important role. I will now provide two examples from the Icelandic literature that I think illustrate the likely importance of the particular circumstances in Iceland on the found effects.

Example 1: Cardiovascular health

Not all medical conditions are likely to be affected by external factors (e.g. genetically determined diseases). Cardiovascular health is however very responsive to various exposures, for example stressful circumstances, such as war (Bergovec et al. 1992a; Bergovec et al. 1992b), earthquakes (Aoki et al. 2012a; Aoki et al. 2012b; Leor et al. 1996), and sporting events (Baumhakel et al. 2007; Zimmerman et al. 2010; Wilbert-Lampen et al. 2008; Carroll et al. 2002; Kloner et al. 2009). For this reason, cardiovascular outcomes have been of great interest in the international literature on business-cycle effects (see for example studies by Gerdtham and Ruhm 2006; Ruhm 2015, 2007, 2003; Neumayer 2004; Tapia Granados and Ionides 2011), with the general finding that recessions, modelled with unemployment rates or GDP, are beneficial to heart health, although this finding is certainly not without exception. Due to the sensitivity of cardiovascular disease to various circumstances and the attention it has gotten in the international literature, it seemed a priori plausible that as large an economic event as the collapse in Iceland in 2008 would affect cardiovascular health in Icelanders. This has now been given considerable thought and multiple papers on cardiovascular disease and its business-cycle related determinants in Iceland have been published.

Studies examining business cycles extending over a time period prior to the Great Recession in Iceland have generally shown null-effects or negative effects on heart health during times of increased economic activity (Birgisdóttir & Ásgeirsdóttir, 2017, Ólafsdóttir et al., 2016). Thus it would be natural to expect null-effects or improved heart health following the collapse of 2008. However, that was not the case. Asgeirsdottir et al. (2014b), Birgisdottir et al. (2017) and Eiriksdottir et al. (2015) do for example all find increased risk of hypertension following the economic collapse in different subpopulations (the female population, the male population and among pregnant women). Furthermore, data from the emergency departments in Iceland's capital area indicate a considerable increase in cardiac emergency department attendance in the first week of the crisis, if defined as the week following the historic prime minister´s address to the nation (Gudjonsdottir et al., 2012). The seemingly contradictory results between studies examining the time prior to the Great Recession vs the effects during the Great Recession are highlighted in Birgisdóttir et al (2018), where the same pattern of contradictory findings is confirmed in an exceptionally large study of the whole adult population of Iceland, and where the same methodology and data are used to examine both the general business cycle on one hand and the Great Recession on the other hand. A summary of an interesting finding from that work is shown in Table 1.

Table 1 shows two effects. The dependent variable in the regressions is ischemic heart disease in all cases. In the first column, a general business-cycle effect, modelled using the unemployment rate, is shown. Results are in accordance with the previous literature, that hard economic times may actually be good for heart health. However, column two shows the effect of the economic collapse of 2008, modelled with time, showing the probability of ischemic heart disease to increase after the economic collapse. This is not in accordance with the business cycle literature. However, it is not a surprising result when evaluated in the context of the stressful-events literature, but the Icelandic economic collapse was particularly dramatic and sudden. Thus different economic downturns may not just have differing effects, they may have the opposite effect. This is further highlighted in the third column, which shows

that the coefficients hardly budge when estimated together, indicating two fairly separate and distinct effects.

Table 1: Estimates of the probability of an Ischemic Heart Disease (IHD) event among men

Unemployment rate	-0.0903***		-0.0893***
	(0.0322)		(0.0322)
Oct 2008 -Dec 2008		0.0082*	0.0080
		(0.0050)	(0.0050)

*Notes: Point estimates are computed using linear probability model with individual fixed effects, adjusting for age fixed effects, time trend, seasonality, marital status, number of children in the household, and residency. Robust standard errors in parentheses. *p<0.1, **p<0.05, ***p<0.01. N=22,570,569, based on Icelandic males >15 years of age over the time period 2000-2015. Average number of IHD events per year is 1,339. Coefficients are interpreted as changes (in percentage points) in the probability of an IHD event.*

Source: Birgisdóttir et al. (2018)

Thus the Great Recession in Iceland is not just like any other business cycle in Iceland. It has a distinct effect that not just different in size, but even in direction, from the general business cycle effects or other changes in economic activity measured in Iceland. It is not unreasonable to associate this with the particular features that characterized the economic downturn that started in 2008 in Iceland, and hypothesize that the speed and velocity of the economic changes created a shock effect. This highlights the importance of the difference in the type of economic conditions at different times, even if those happen within the same social and institutional context. Although limited, some recent evidence has suggested that large economic shocks may have effects that differ in relative size or direction from those of smaller shocks (Ruhm, 2016). The evidence from the Icelandic literature appears to be in accordance with that.

Example 2: Health Behaviors

Changes at the macroeconomic level can affect health and mortality in various ways. The level of economic activity can influence such external determinants of health as air pollution and traffic accidents. Changes may also work through individual-level changes in health behaviors as a result of changes in each individuals incentives, including leisure time and income. Unemployment or fewer work

hours for an individual can thus influence that particular individuals consumption of time-intensive behavior while changes in income can influence the consumption of money-intensive goods. By using individual-level data researchers have been able to study such individual-level mechanisms and separate them from ambient effects. Table 2 shows changes in consumption participation over the economic collapse for several products, that is weather those are commodities that the individual regularly consumes. Those are effects after controlling for the pathways often hypothesized, that is income and labor supply, as well as traditional individual-level controls, such as basic demographics. The remaining effect could be due to various society-level factors, but in Table 2, those effects are held up against changes in prices for the commodities at hand. This is deemed interesting due to the fact that Iceland is a small open economy with its own currency that lost considerable value, and with that Icelanders saw substantial changes in relative prices, depending on the level of imports within each consumption category or the level of imports needed for the production of domestically produced products.

Table 2: Participation Elasticity Calculations of Various Commodities in Iceland between 2007 and 2009

Commodity	Real Price Change (%)	Participation Change (%)	Participation Elasticity
Tobacco	13.1	-14.8	-1.125
Alcohol	21.4	-12.3	-0.573
Soft drinks	29.8	-18.9	-0.634
Sweets	22.6	-5.6	-0.248
Fast food	-3.5	2.5	-0.714
Indoor Tanning	11.4	-1.7	-0.147
Fruits	64.5	-7.8	-0.121
Vegetables	10.5	-10.0	-0.956
Fish oil	-8.8	4.6	-0.522
Vitamins and supplements	6.6	-1.8	-0.123

Notes: Price changes are calculated from November of 2007 to November of 2009 and adjusted according to the Consumer Price Index, which rose by 27.3% during the period. Prices were obtained from Statistics Iceland. Participation change is calculated net of mediators and time-varying covariates, as the change between 2007 and 2009 indicator, divided by the mean value of the behavior during 2007. The participation elasticity is calculated by dividing column (2) by column (1).

Source: Ásgeirsdóttir, Corman, Noonan, Ólafsdóttir, and Reichman (2014a).

The calculations presented in column 3 of Table 2 are elasticities, but it should be kept in mind that they are not direct elasticity estimations, but trial calculations of possible price elasticities, under the assumption that the found effect in Iceland might be largely due to price changes. However, this is not known a-priori. The interesting thing to note is the fact that the calculated examples of participation elasticities are in fact quite sensible. This suggests that the changes in health behaviors due t o the Great Recession in Iceland likely operated largely through price changes. Such price changes are generally not nearly as pronounced in other economic fluctuations being examined in the international literature, but specific to the Icelandic situation and this particular collapse. Again, this highlights the importance of the difference in the type of economic conditions being examined each time, as those circumstances can have very different effects of peoples lived experiences.

Conclusions

We conclude that one important lesson from the literature on the effects of the Icelandic economic collapse on health and health behaviors is the necessity for those contributing to the international literature to give increased attention to the nature of various business-cycle changes. The business cycles have up until now been modelled in a rather crude way, while outcomes and pathways have been given greater consideration and thought. This fact was illustrated with two examples. Those two examples are provided to highlight the point that although economic conditions have been treated in fairly unrefined terms in the literature, details about the economic conditions may be of considerable importance. While those two examples are pointed out to accentuate this take away from the Icelandic literature, we note that certainly not all results from Iceland appear to be this specific to the Icelandic context. Thus it should be said that those examples are not chosen to cherry pick results that paint a one sided picture, but are presented to highlight the importance of examining health effects across different types of

economic fluctuations. Economists, maybe not least macroeconomist, would do well by focusing on this missing aspect of the literature in future work.

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