THREE ESSAYS ON SOCIAL POLICY: INSTITUTIONAL DEVELOPMENT, AND SUBJECTIVE WELL-BEING AS A CAUSE AND CONSEQUENCE OF LABOR MARKET OUTCOMES

by

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Dedication

For my family and friends.

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Abstract

How can social policy be used to improve societal well-being? First, quality institutions are necessary to implement optimal policies. Second societal well-being needs to be measured to determine optimal policies. Subjective well-being (SWB), or happiness, data are well suited for this purpose, because SWB measures allow individuals to weigh both economic and non-economic outcomes. For these reasons, Chapter 2 addresses the determinants of democratic institutions, while Chapters 3 and 4 discuss well-being directly. In particular, Chapter 2 challenges the so-called political resource curse, finding no robust long-term effects of oil abundance on Polity, civil liberties, political rights, or constraints on the executive. The chapter extends previous empirical work by using multiple measures of democracy, the most current time-series econometrics, and by allowing additional relationship heterogeneity, especially by geographic region and time period. Chapter 3 documents the year 2010 as the lowest level of recorded happiness in the U.S. since consistent measurement began in the 1970s. Disparate declines in income and employment, associated with the Great Recession, are shown to explain the disparate declines in SWB experienced by different demographic groups. Chapter 4 reverses the relationship direction by showing that people reporting higher SWB are less likely to be unemployed in Germany. The mechanisms include changes in the Big-Five personality traits. Within-person increases in extraversion or emotional stability, for example, are associated with increases in SWB. The results also show that the magnitude of the SWB-unemployed relation is substantially larger for people who are currently unemployed, and that too much SWB can also increase the likelihood of unemployment.

Chapter 1 Introduction

Social policy is intended to improve societal well-being. Societal well-being is perhaps best measured with subjective well-being (SWB), or happiness, data because SWB accounts for individuals' feelings about their lives as a whole, including dimensions that are otherwise difficult to measure. The questions then become, can the institutions that are responsible for social policy be improved? And what policies should be implemented to improve SWB? The present dissertation contributes research to further understand these broad questions. The first analysis focuses on the development of formal institutions. The two subsequent analyses focus directly on SWB; the first relates to its determinants, and the second, consequences. Demonstrating SWB has positive consequences on more traditional economic outcomes should reduce the still-present skepticism of subjective measures in economic research and policymaking.

Chapter 2 focuses on democracy as an important institution. It challenges the so-called political resources curse, finding that oil abundance does not have robust long-run negative effects on democracy. Early empirical research found that countries with relatively more mineral resources, especially oil, exhibited lower levels of economic growth. An early theory explained this outcome stating that resources negatively affected political institutions, which in turn hindered economic growth. Consequently much of this literature has shifted focus from economic growth to political institutions, especially democracy. There has been substantial support for the existence of a political resources curse (e.g. Ahmadov 2014), and a few challenges in recent years (e.g. Haber and Menaldo 2011). In Chapter 2, two coauthors and I contribute to the ongoing debate.

Our analysis improves upon comparable studies. We use four measures of democracy including the broad measure Polity, and the three underlying measures, civil liberties, political rights, and constraints on the executive. By using four measures, from three different organizations[1], we test theoretically different mechanisms and reduce concern of measurement error that could have attenuated the oil-democracy relation. Many papers focused solely on Polity (e.g. Haber and Menaldo 2011). We also estimate the relations separately for subsamples of: Latin American countries, countries in the Middle East and North Africa (geography is important in Ahmadov 2014), producers with more or less experience in the industry (experinece is important in Omgba 2015), and the period post 1980. Andersen and Ross (2014) found that the insignificant oil-democracy relationship demonstrated by Haber and Menaldo (2011) becomes statistically significant and negative when estimated for the post-1980 period. We use time-series econometrics to estimate long-run effects separately from short-run changes. Long-run effects capture relationships that are more consistent with the slow pace of institutional change, and separately accounting for short-run changes improves the estimation precision. We also allow for relationship heterogeneity across countries and account for bias caused by common cross-country effects, such as regional democratic development or world oil prices. Yet in the various specifications, subsamples, and robustness tests we do not find consistent evidence of a within-country democratic resource curse.

Chapters 3 and 4 contribute to the economics of happiness (or SWB) literature. A more complete understanding of SWB - documenting it, its determinants and outcomes - will help to set policy goals and evaluate current systems (Frey and Stutzer 2010; 2012; and Frey and Gallus 2013). SWB measures are complementary to more objective measures (Fleurbaey 2009; Stiglitz

[1] Polity is from the Polity IV Project; civil liberties and political rights are from Freedom House; and constraints the executive is from Polcon.

et al. 2009), but have the advantage of including whatever economic and non-economic factors that individuals value. It is precisely because objective measures miss important dimensions of well-being that I use SWB data in Chapter 3 to document the impacts of the Great Recession. For example, Lucas (1987) argued that business cycles are not very important determinants of well-being when using aggregate consumption as a measure of well-being. However when using SWB, macroeconomic volatility was found to have 'moderate but important' effects on well-being (Wolfers 2003).[2] The effects of unemployment on well-being serve as an example at the micro level. For individuals, the non-pecuniary effects of being unemployed are larger than the effects from income loss alone (Winkelmann and Winkelmann 1998).

Chapter 3 addresses the question, which demographic group suffered the most during the Great Recession. For the U.S. population a whole, the year 2010 marked the lowest level of happiness recorded since 1972 - based on the nationally representative General Social Survey (GSS). Happiness trended downward over this period and there were further declines during the Great Recession. However, experiences differed substantially by demographic group. For this reason, I estimated group-specific declines, from group-specific trends, that occurred during the years 2008 and 2010. By the year 2012, the population had recovered to pre-recession trends.[3] Of the population groups studied, the foreign-born fared the worst with declines in the likelihood of reporting the top happiness category (of three) by approximately fifteen percent. In contrast, the full population reported a decline of approximately five percent and young adults (18-24), two percent.

Declines in income and employment best explain the happiness declines in 2010. To determine the potential mechanisms, micro and macro controls were added to the base

[2] The author purposely contrasts the two results to highlight benefits of SWB.

[3] During the years surrounding the Great Recession, the GSS is fielded every two years.

regressions that were used to estimate the declines. In the base regressions, the declines were estimated as dummy variables, for the years 2008 and 2010, that capture the otherwise unobserved factors that are coincident with those years. Income and employment variables are shown to operate as mechanisms because their inclusion reduced the significance of the dummy variables, thus accounting for the unobserved variation. Chapter 3 also discusses the other important micro and macro controls and how the income and employment relations with happiness changed during the Great Recession. Understanding the impact of the Great Recession, and the channels through which it operated, could help policymakers plan for future recessions.

In Chapter 4, people reporting higher SWB are shown to be less likely to be unemployed in Germany (1996 – 2013), based on longitudinal data from the German Socio Economic Panel. SWB is not only an outcome of interest, but also, a determinant of outcomes that economists have traditionally been interested in. In recent years there has been a growing consensus that psychological factors are important for performance, which represents a large improvement in the field. Previously unobserved ability was thought of in terms of intelligence and did not include psychological characteristics. Models of performance are now more likely to include psychological characteristics using the Big-Five personality traits. However, relying on the Big-Five traits is still limiting for empirical work because they are not broadly available. In contrast, SWB is available in at least 162 countries and over a longer period of time (e.g. since the 1970s in the U.S.). SWB positively affects a great many factors too, including health, productivity, and social relations. The results from Chapter 4 suggest human capital models should include psychological traits like SWB, and that social policy that improves SWB should also pay off in terms of improved labor performance.

The SWB-unemployed relation exhibits a meaningful magnitude. A one standard deviation increase in lagged SWB is associated with approximately a one-percentage point decline the likelihood of being unemployed. Mechanisms include the Big-Five personality traits. For example, within person increases in extraversion or emotional stability are associated with increases in SWB. There are two important variants to the relation. First, it is quadratic in nature. At high levels of SWB, people that report higher SWB are more likely to be unemployed. Second, the magnitude of the SWB-unemployed relation is greater for people that are currently unemployed, meaning SWB is more important for becoming reemployed than staying employed.

The results in chapter 4 are based on panel regressions of unemployed status (binary) on lagged SWB and a host of additional controls, including lagged employment status or fixed effects. The potential for important omitted variables is greatly reduced through the inclusion of these controls. Concern of reverse causality is addressed by including lagged unemployment and controls for labor market expectations. I also use a placebo test to show that systematic measurement error that may be present in satisfaction variables does not account for the observed relationship. Further support for the main results is provided by regressions that simultaneously: are dynamic, include fixed effects, and allow for endogeneity in the controls (Arellano and Bond 1991).

1.1 What is Subjective Well-Being

Subjective well-being measures are based on the responses to survey questions concerning one's well-being. While there are different types of SWB, the focus in this dissertation is on evaluative measures. As the name implies, evaluative measures ask the respondent to evaluate their lives, often on a scale from zero to ten, with ten indicating high satisfaction with life. They provide

consistent and meaningful measures of well-being. They: show a high degree of correlation between subject responses over a short period of time, are well explained by life circumstances, predict future behavior, and correlate well with other subjective and objective measures of well-being. Alternative experiential or emotional SWB measures, such as positive affect, are not as closely related to life circumstances (Helliwell and Wang 2012).[4] For a further discussion of the types of SWB questions and their reliability and validity see (Helliwell and Wang 2012; OECD 2013; Kapteyn et al. 2015).

The economics of happiness (or SWB) is becoming an increasingly important area of research. From the year 2000 to 2011, there was a fivefold increase in the number of articles published annually on topics pertaining to 'happiness' or 'subjective wellbeing' (Tay, Kuykendall, and Diener 2015). Official statistics are being recorded by a growing number of countries and organizations (including the United States and OECD) (Durand and Smith 2013), and at least six Nobel laureates in economics have advocated obtaining subjective measures of well-being (Stiglitz, Sen, and Fitoussi 2009).

For skeptics of SWB measures, several common concerns are easily addressed. First, interpersonal comparison of utility can be avoided by instead comparing individuals over time using fixed effects. Second, SWB measures are ordinal in nature, yet many researchers treat them as cardinal. However, results do not vary much when treating the scales as ordinal or cardinal (Ferrer-i-Carbonell and Frijters 2004). Moreover, ordered discrete choice specifications can be used to address this concern directly, as in Chapter 2. Last, the SWB scale is bounded. While true, there is still meaningful movement available for many countries and for population groups within a country. Sub-Saharan Africa currently has a SWB score of less than five on a

[4] An example of an experiential question is, "How happy were you yesterday?".

scale from 0 – 10 (Helliwell, Layard, and Sachs 2017), and African Americans have experienced a positive trend in the United States since the 1970s (Chapter 3).

Much of the literature uses SWB as an outcome variable. It has even been suggested as a measure of utility. For example in a 2007 article, Gary Becker and Luis Rayo state, "… we consider that maximizing happiness is closely linked, if not identical, to maximizing utility in the standard economic way (Rayo and Becker 2007, 487)." However, SWB can be used as a determinant as well. Indeed the United Nations publication, *World Happiness Report* (2013), summarizes the evidence for the benefits of SWB on health and longevity, income, productivity, and individual, organizational, and social behavior (De Neve et al. 2013, 56-57). More recently the results published in a *Journal of Labor Economics* article, led the authors to say, "… it appears that economists and other social scientists may need to pay more attention to emotional well-being as a causal force (Oswald, Proto, and Sgroi 2015, 807)."

Chapter 2 Does Oil Curse Democracy? A Long-Run Time-Series Analysis of 127 Countries[5]

2.1 Introduction

The resource curse is a topic studied intensively in both economics and political science. The original discussion centered on why countries with large resource industries, typically measured by the share of natural resource exports in Gross Domestic Product (GDP), seemed to have slower rates of GDP growth than other countries. Many different reasons for this phenomenon have been offered. One prominent view traces the growth shortfalls experienced in natural resource-rich countries to their weak political and other institutions. The question then becomes whether countries with greater natural resources happen to have weak institutions or if natural resources retard the development of political institutions like democracy. Consequently, much of the resource curse literature has shifted to focus on the latter question.

The purpose of this paper is to examine the long-term effects of changing oil and gas values on an overall measure of democratic development (Polity), and three underlying characteristics of democracy: constraints on executive power (Polcon), Civil Liberties, and Political Rights. Most comparable studies have focused on Polity, yet disaggregation is necessary for several reasons. First, because the effects of oil could differ from one element of democracy to another. Second, their importance for economic growth (or objectives) might well differ. Third, as will be shown, the actual trends in these different measures differ substantially, for example Civil Liberties and Political Rights were fairly stagnant in the Middle East and North Africa, but Polcon and Polity generally increased. Last, the use of additional measures increases the variability in the data. For countries like the United States and Norway, change over time can only be detected using Polcon, because these countries reached the upper limit of the other

[5] This chapter was co-written by Kelsey J. O'Connor, Luisa R. Blanco, and Jeffrey B. Nugent.

measures many years ago. Nevertheless, we find that the long-run effects of oil abundance are not statistically significant for any of the four democracy measures. Indeed, this finding is supported by the results generated from multiple estimation strategies and separately for different country groups and time periods.

Part of our contribution is the application of advanced time-series econometric methodology. Most importantly, we separately identify the long-run effects of oil abundance from short-run fluctuations. Long-term effects come from sustained changes over periods of several years. They correspond better with the slow speed of institutional change, while annual fluctuations in oil prices, e.g., are less likely to have lasting effects. Long-run effects are also consistently estimated even in the presence of reverse causality. To identify long-run effects, two different time-series models are used, specifically an error correction model and a distributed lag model. Error correction models are more common and have been used before, but previous researchers have typically not addressed two potentially serious sources of bias. In particular, they assume the relationship between oil and democracy to be identical across countries, and also do not control for cross-sectional dependence. In contrast, our analysis has the advantages of allowing for heterogeneous relationships by country, and controlling for omitted common correlated effects (or cross sectional dependence). Both the error correction and distributed lag models control for these sources of bias, but they differ in other ways that are discussed in the methods section.

While our analysis differs substantially from existing analyses, we deem it important to also compare our results with those obtained in two recent studies that also focus on the long-run effects of oil on democracy. Haber and Menaldo (2011) (henceforth "HM") provides evidence (like us) suggesting that oil abundance does not have a long-term effect on democratic

development (using Polity alone). However, Andersen and Ross (2014) (henceforth "AR") reevaluate the relationship using the same data and similar methodology, and offer support for significant-negative effects of oil after 1980. This disagreement over the existence of long-run effects highlights the current political-resource-curse debate. The present study suggests a conclusion more like that of HM, but show that this conclusion holds not only for Polity but also for Polcon, Civil Liberties, and Political Rights. In addition, when we use the same data and techniques as used by HM and AR, we show that AR's significant-negative effects (after 1980) are not robust. We conclude therefore, that there is no robust evidence of a within-country democratic resource curse.

2.2 Background

The oil as blessing or curse literature has generated many variants, which have been of great interest to both economists and political scientists. For economists the most debated one concerns the effect of oil endowments on long-term growth. Do they raise long-term growth rates or lower them? Recent empirical analyses provide evidence that oil does not affect growth rates with examples including James (2015) and Smith (2015).[6] However the existence of a resource curse is still debated. One important arm has suggested that the link between natural resources and growth may depend on whether or not various adverse links through the quality of institutions (especially democracy) are realized (Andersen and Aslaksen 2008; Robinson, Torvik, and Verdier 2006).[7]

[6] James (2015) explains that slower economic growth in resource-dependent countries is due to a slow-growing resource sector, contrasting views that oil has sweeping negative effects, and Smith (2015) finds resource discovery is in fact positively associated with the level of GDP per capita.

[7] James (2015) provides a recent review on the literature on the resource curse. Another commonly asserted institutional link between oil and growth is via corruption. Oil's harmful effects on corruption have been shown

Much of the attention on the resource curse has shifted to analyzing the effect of oil endowments on democracy. Following some earlier work by Barro (1998) showing that countries with substantial oil (measured by an oil dummy) had a negative effect on democracy, Acemoglu and Robinson (2006), Haber and Menaldo (2011), and Menaldo (2013) provided a rationale in terms of state capabilities, which includes the ability to collect taxes. For citizens to be willing to pay taxes, they are likely to insist that the state agrees to let them have a say in what the state does, i.e. by adopting democratic institutions. If the state has an alternative means of sustaining itself, such as by selling off its oil or other natural resources, it can avoid the costly process of developing the capability to tax its citizens and having to give those citizens more say over what the government does. Only when the oil-endowed country adopts institutions like the effective rule of law and democracy can such countries use oil to their advantage. The political version of the oil curse (Mahdavy 1970; Beblawi and Luciani 1987; Przeworksi et al. 2000; Ross 2001; Ross 2012) however, argues that oil rents directly retard the development of democracy through increased rent-seeking behavior, rent grabbing, and leaders locking out the rivals.[8]

The number of studies on this political version of the resource curse has grown significantly. Ahmadov (2014) has conducted a meta–regression analysis on the basis of data taken from 29 existing publicly available studies on the relation between oil rents and democracy. After controlling for the many different methodological differences, time periods, and country coverage, Ahmadov (2014) finds the overall effect of oil rents on democracy to be small, negative, and significant, but with considerable heterogeneity across regions, being

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empirically numerous times, examples including: Ades and Di Tella (1999) (one of the first); Vicente (2010), which exploits a natural experiment; and Brollo et al. (2013) which provides plausibly causal estimates in Brazil.

[8] The rationale for the rent-seeking link between oil abundance and lower levels of income and welfare is that the rents from natural resources are likely to divert entrepreneurs from productive activities into rent-seeking ones Torvik (2002).

somewhat more negative among countries of the Middle East and North Africa but positive and highly significant in Latin America.

2.3 Data

2.3.1 Variables, Data, and Sample Coverage

Oil abundance is measured as oil and gas value per capita (Ross and Mahdavi, 2015). Oil and gas value is defined as extraction of oil and gas multiplied by the unit price. The data are considered to be superior to oil rents data obtained from the World Development Indicators (WDI).[9] For one reason, oil and gas value is based on data from multiple sources (including the WDI), which increases the sample coverage (Mohtadi, Ross, and Ruediger 2015). For purposes of estimation, the natural log of real oil and gas value per capita are used (henceforth "O&G Value").

As noted above, we use four complementary but distinct measures of democratic institutions: Polity, Civil Liberties, Political Rights, and Polcon. Polity (Polity 2011) is perhaps the most commonly used indicator of democracy. It is "an index of the competitiveness of political participation, the openness and competitiveness of executive recruitment, and the constraints on the chief executive" (HM, 4).

Civil Liberties and Political Rights disentangle two attributes of democracy that might otherwise be concealed by Polity. BenYishay and Betancourt (2014) argue that Civil Liberties are more persistent than Political Rights and tend to encourage the development of Political Rights to a greater extent than Political Rights do for Civil Liberties. For this reason, Civil Liberties would seem to be more important in the promotion of democracy in the long run. Political Rights relate to free and fair elections, while Civil Liberties refer to the protection of

[9] The WDI rents data are nationally reported, and as such could be biased by institutional characteristics, and because the cost component is generally estimated at one point in time, rents do not accurately change over time. (Mohtadi, Ross, and Ruediger 2015).

individual rights such as freedom of speech, freedom of assembly and equal treatment under the law (Freedom House, 2013).

Our fourth measure of democratic institutions is Polcon (Polcon 2012). Distinct from the other three variables, it measures "the number of independent veto points over policy outcomes and the distribution of preferences of the actors that inhabit them (Henisz 2002, 380)." Polcon scores rise with the number of veto players,[10] which places additional constraints on the executive and are thought to increase regulatory stability and credibility. Several studies of oil abundant countries have shown that government expenditures are far less volatile, procyclical, and erratic when the chief executive is constrained by one or more veto players as captured by Polcon (Collier and Hoeffler 2009; Elbadawi and Soto 2016; Selim and Zaki 2016).

The period of analysis (1974-2012) was based on data availability for the key variables. In particular Civil Liberties and Political Rights only become available in 1974. The sample of 127 countries is also based on the availability of data. Countries with less than 30 years of coverage were excluded from the sample, because the analysis involves estimation of country-specific relationships, which requires a sufficient number of observations (Chudik et al. 2013, 26).

GDP data are primarily from the WDI (World Bank 2013). When GDP data from this source did not extend back into the 1970s, growth rates implied by data from the Penn World Tables (PWT) (Heston et al. 2012) or an earlier WDI publication (World Bank 1995) were used to extrapolate backwards.

[10] Veto players are most commonly the lower and upper branches of the legislature, the judiciary, other units of the government, or subnational governments.

2.3.2 Subsample Definitions

Once the sample was determined for our base analysis, two further classifications were used. First, we break the sample into countries that have mature oil industries and countries with less experience. We also break the sample into three regional classifications, Middle East and North Africa (MENA), Latin America and the Caribbean (LAC), and the rest of the world (ROW). The rationale for using these categories is discussed below.

Industry Tenure Motivation:– The timing of oil discovery is likely to affect how oil abundance affects institutions. Countries that discovered oil later may have had the time necessary to develop sufficient state capacity to avoid the adverse effects of oil, such as: increased civil conflict (Collier and Hoeffler 2005), reduced transparency (Mohtadi, Ross, and Ruediger 2015), and increased fiscal volatility. Indeed the evidence supports this argument. Tsui (2011) found that those countries that experienced major oil discoveries early in time developed democracy significantly more slowly than countries that did not. However, countries that were at least somewhat democratic initially did not experience the negative effects of oil.

The evidence from Omgba (2015) also suggests that mature producers are likely to be less democratic. The main finding from Omgba (2015) is that both Polity and the Voice and Accountability index (the most democracy-oriented measure from the World Bank's World Governance Indicators) are positively related to the period of time between the beginning of oil production and a country's political independence, which means that a country that discovered oil later (relative to political independence) exhibits higher levels of democracy. He argues that oil discovery before political independence negatively affects export diversity and institutional development. Blanco, Nugent, and O'Connor (2015) also considers oil industry maturity, but

found somewhat nuanced effects, the number of years since peak oil discovery having a positive effect on government stability, a negative effect on bureaucratic quality, while oil had no causal effect on democracy itself.

To allow for different effects of oil by industry experience, we divide the sample into Mature and non-Mature producers (also referred to as Low-Experienced). Countries that discovered oil before the median discovery year (1959) were considered mature. The year of oil discovery is available from *The World History of Oil and Gas* (Geo-Help Inc. 2011).

Geographic Differences:– Treating the Middle East and North African and Latin American groups separately is important because there are important differences between them in their historical experience, culture, and socio-economic conditions. Not surprisingly, and as noted above, much of the existing literature has shown that the relationship between democracy and oil varies substantially across different parts of the world. In particular, the Middle East and North Africa has long been identified as a region with both substantial amounts of oil and very little democracy. When oil was discovered in the Middle East and North Africa between 1930 and 1965, these countries were extremely low on educational attainment, state capacity, and urbanization, which helps explain their low initial levels of democracy. While democracy has been on the rise throughout much of the world since then, its level has remained low in MENA (Huntington 1991; Przeworksi et al. 2000).

The low levels of democracy in MENA were partially attributed to oil. Barro (1998) used pooled international cross-sections to show that urbanization, education, life expectancy and lagged democracy all had positive effects on subsequent democracy and that an oil dummy variable had a significant negative effect. More recent studies have continued to highlight the

failure of MENA countries to democratize over time (Ross 2012, 75; Hertog 2007). Herb (2005) also showed that MENA countries had the lowest democracy scores in the world, but attributed much of this to the influence of regional neighbors because it also applied to MENA countries without oil. The effects of regional neighbors are accounted for in our analysis, which is discussed further in the methods section.

Other scholars, however, have pointed to another distinctive pattern in Latin America. For example, Dunning (2008) pointed to the fact that in Latin America oil seemed to be positively related to the adoption of democracy. There are several possible explanations for this apparent exception. First, countries with greater oil rents may face less resistance to democratization from wealthy elites. Wealthy elites are fearful that democracy will bring greater taxation and expropriation of private wealth, especially in high income-inequality nations like those in Latin America. However, oil wealth reduces government's need for non-resource revenues, and therefore elites' fear of democracy. Additional explanations for Latin America's exceptionalism may be (1) that their governments generated mass political support through skilled control and redistribution of the resource rents, or (2) that they simply have been less dependent on natural resource rents than the Middle Eastern and North African countries, for example (Sinnott, Nash, and Torre 2010).

The evidence supports Latin America's exceptionalism. Ross (2012, 74, 85–86) concedes this point, but notes the explanation is unclear. Sinnott, Nash, and Torre (2010) provides support for Dunning's (2008) theory, but also discusses how the relationship may have changed, because the recent resource booms seem to have weakened, not strengthened, democracy in Latin America. The authors call attention to the need for further research based on more recent data.

Appendix Table A-1 includes summary statistics for the sample as a whole, and for each country group separately. The list of countries in each group is included in Appendix Table A-8.

2.4 Methods

To estimate the effects of O&G Value on institutional development, we use two forms of an error-correcting autoregressive distributed lag (ARDL) model and a distributed lag model. Before introducing the specific models, it is helpful to understand the assumed data generating process presented below.

$$Inst_{it} = \sum_{j=1}^{p} \lambda_{ij} Inst_{i,t-j} + \sum_{j=0}^{q} \delta_{ij} Oil_{i,t-j} + \mu_i + \varepsilon_{it} \quad (2\text{-}1)$$

$Inst_{it}$ represents the institutional measure (Polity, Polcon, Civil Liberties, or Political Rights) for country i at time t. Each institutional level is assumed to depend on a set of its past levels, on $Oil_{i,t}$ (O&G Value), and its past levels. Country heterogeneity is allowed by using country-specific coefficients and fixed effects μ_i. O&G Value is used as the sole explanatory variable because oil is theorized to have sweeping economic and social effects (as in Ross, 2012), and other controls might have the effect of capturing some of the possible channels through which O&G Value may affect institutions. As such, our empirical method aims to estimate the full effects of oil on institutions, although admittedly not the channels through which they operate.

For estimation, we reparameterized Equation (2-1) into an error correction form. In error correction form, the long-run relationship between oil and institutions can be consistently estimated separately from short-term fluctuations. The error correction form is appropriate because annual fluctuations in O&G Value are unlikely to have lasting impacts on institutions while sustained increases over a few years may have such effects. Estimates from Equation (2-1)

could be confounded by noise from annual fluctuations, while Equation (2-1) in differences would limit the interpretation of the results to the short-term changes.

An error correction form of an ARDL model is presented below as Equation 2-2.

$$\Delta Inst_{it} = \phi_i\left(Inst_{i,t-1} - \theta_i Oil_{it}\right) + \sum_{j=1}^{p-1} \lambda_{ij}^{*} \Delta Inst_{i,t-j} + \sum_{j=0}^{q-1} \delta_{ij}^{*} \Delta Oil_{i,t-j} + \mu_i + \varepsilon_{it} \qquad (2\text{-}2)$$

Where: $\phi_i = -(1 - \sum_{j=1}^{p} \lambda_{ij})$; $\theta_i = \sum_{j=0}^{q} \delta_{ij} / (1 - \sum_k \lambda_{ik})$;

$$\lambda_{ij}^{*} = -\sum_{m=j+1}^{p} \lambda_{im}; \text{ and } \delta_{ij}^{*} = -\sum_{m=j+1}^{q} \delta_{im}.$$

The short-run relations are captured by δ_{ij}^{*}, while the long-term relationship is captured by θ_i. With a large change in Oil_{it}, the response in the dependent variable might overshoot the long-run equilibrium relationship. When this happens, the error correction term, ϕ_i, serves to bring the relationship back to the long-run one (hence the term "error correction"). The lag orders p and q were set to three, using Akaike and Schwarz's Bayesian information criteria.[11]

For an error correction model to be appropriate, (1) the error correction term should be statistically significant, negative, but greater than negative two, and (2) there must be a long-run cointegrating relationship between the level variables.[12] Both institutional development and O&G Value are likely to be persistent and have trends of integration order one (I(1)), and the cointegrating relationship, θ_i, must exist for the term $\left(Inst_{i,t-1} - \theta_i Oil_{it}\right)$ to be stationary. Stationarity is necessary for the equation to balance when ϕ_i is statistically significant. Results for the necessary tests are discussed further in the results section.

[11] The lag order was selected separately by country and democracy variable and then averaged. Averages were between two and three for each variable and then rounded up to three. The results are also not very sensitive to lag order. We find similar results when using two lags instead of three lags.

[12] The first condition is met in all estimations (see the coefficient on the lagged dependent variable in Appendix Tables A-2 – A-5 for estimates of the error correction term). Cointegration is discussed at the end of the Results section.

ARDL models have several advantages. The long-run effects are consistent, regardless of whether the level variables are stationary or trended, and they are consistent in the presence of reverse causality (Chudik et al. 2013, 26; Pesaran 2015). We use two different error correcting ARDL models that differ in the amount of restrictions applied. The most restrictive model assumes the relationships are common across panels (basic dynamic model with panel fixed effects, called "DFE"). We focus on the most flexible model, the mean group (MG) model, which simply estimates the ARDL model separately for each panel (allowing for heterogeneous short-term and long-term effects) and then reports the mean coefficients across panels. The MG model loses efficiency compared to the DFE model but is more appropriate when the estimated relationships are heterogeneous across countries.

There is another ARDL model that is a hybrid of the MG and DFE models, called the pooled mean group (PMG). It allows the short-run effects to differ across countries, but assumes the long-term effects are common. The PMG model should be more efficient than the MG, but less efficient than the DFE and possibly still subject to bias. Consequently we focus on the more consistent MG model, but present the most efficient (DFE) results for robustness purposes, and also because DFE models are common in the related literature (e.g. HM).

Our specifications also correct for cross-sectional dependence using a common correlated effects approach, which simply adds cross-sectional means of the dependent and independent variables and their lagged values to the ARDL specification (as suggested by Chudik and Pesaran, 2013). Cross-sectional dependence arises when the error terms are correlated across observations. In the present analysis, cross-sectional dependence could be caused by an omitted common correlated effect, e.g. oil prices. Controls for oil prices, subtracting the cross-sectional

mean of each variable, clustering errors, or simply using year fixed effects could partially account for common correlated effects, but these approaches have limitations (Westerlund 2007).

Equation 2-3 below presents the same error correction model as in Equation 2-2, but adds the modification for cross-sectional dependence, referred to as a cross section augmented error correction (CS-EC) model.

$$\Delta Inst_{it} = \phi_i\left(Inst_{i,t-1} - \theta_i Oil_{it}\right) + \sum_{j=1}^{p-1} \lambda_{ij}^{*} \Delta Inst_{i,t-j} + \sum_{j=0}^{q-1} \delta_{ij}^{*} \Delta Oil_{i,t-j} + \mu_i$$

$$+ \sum_{l=0}^{3} \psi_{il} \bar{Z}_{t-l} + \varepsilon_{it} \qquad (2\text{-}3)$$

Where $\bar{Z}_t = (\overline{Inst}_t, \overline{Oil}_t)$; $\overline{Inst}_t = N^{-1} \sum_{i=1}^{N} Inst_{it}$; $\overline{Oil}_t = N^{-1} \sum_{i=1}^{N} Oil_{it}$

Using the common correlated effects approach, the effects of O&G Value are estimated from the relationship between idiosyncratic deviations from mean O&G Value levels and idiosyncratic institutional deviations from the mean. $\bar{Z}_t$ captures the average relationships, observed and unobserved.[13] Average levels of factors that affect institutions are accounted for, such as the effects of neighbors, regional institutional change, economic development, and urbanization. Factors affecting O&G Value, such as oil prices are also captured. Lagged cross-sectional means capture any serial correlation in omitted factors. The lag order is set as the integer value of the cube root of the number of time periods, in our case three lags are used (Chudik et al. 2013).

We also use a cross section augmented distributed lag (CS-DL) model. It differs from the CS-EC models, is considered complementary, and possibly superior when using highly persistent variables, such as democracy. The specification of this model (Equation 2-4) is similar to the CS-EC model, but the dependent variable is modeled in levels, and the specification does not include lags of the dependent variable as explanatory variables (in levels or changes).

[13] Bove, Elia, and Smith (2015, 8) identify another benefit of the common correlated effects approach. It has similarities to counterfactual analysis because the cross-sectional averages are similar to predicted counterfactuals.

$$Inst_{it} = \theta_i Oil_{it} + \sum_{j=0}^{q-1} \delta_{ij}^{*} \Delta Oil_{i,t-j} + \mu_i + \psi_i^0 \overline{Inst}_t + \sum_{l=0}^{3} \psi_{il}^1 \overline{Oil}_{t-l} + \varepsilon_{it} \quad (2\text{-}4)$$

As in the CS-EC model, the lag order on $\overline{Oil}_{t-l}$ is set as the integer value of the cube root of the number of time periods (three). However, unlike the CS-EC model, the lag order on the cross-sectional mean of $\overline{Inst}_t$ is set to zero (Chudik et al. 2013, 15).

Each of the models, two CS-EC and one CS-DL model, are used in estimating the results. It should be remembered that the CS-EC models are each specified in error correction form and differ simply in whether or not the short-run and long-run relationships are assumed to be homogeneous across countries. Of the CS-EC models, the mean group, cross-sectionally augmented, error correction model (MG CS-EC) is the least restrictive, allowing for heterogeneous short- and long-run relationships. The DFE CS-EC model is the most restrictive, assuming homogeneous short- and long-run relationships. The MG CS-DL model differs from the MG CS-EC model because it uses the distributed lag specification (instead of an error correction), but is similar in that it allows for heterogeneous short- and long-run relationships.

2.5 Results

2.5.1 Polity, Polcon, Civil Liberties, Political Rights, and O&G Value Over Time

Figure 2-1 illustrates how the levels of Polity, Polcon, and O&G Value have moved over time in the full sample of 127 countries and in each of the country groups identified above. The series have been smoothed to help reduce annual fluctuations and more closely represent long-run trends. In most of the country groups, O&G Value declined from the mid to late 1970s until the early 1990s when O&G Value began to increase again. Both Polity and Polcon generally increased like democracy. However, Polity started at a higher level than Polcon and increased at

a greater rate. Figure 2-2 presents corresponding trends for Civil Liberties and Political Rights, which like Polity and Polcon were generally increasing.

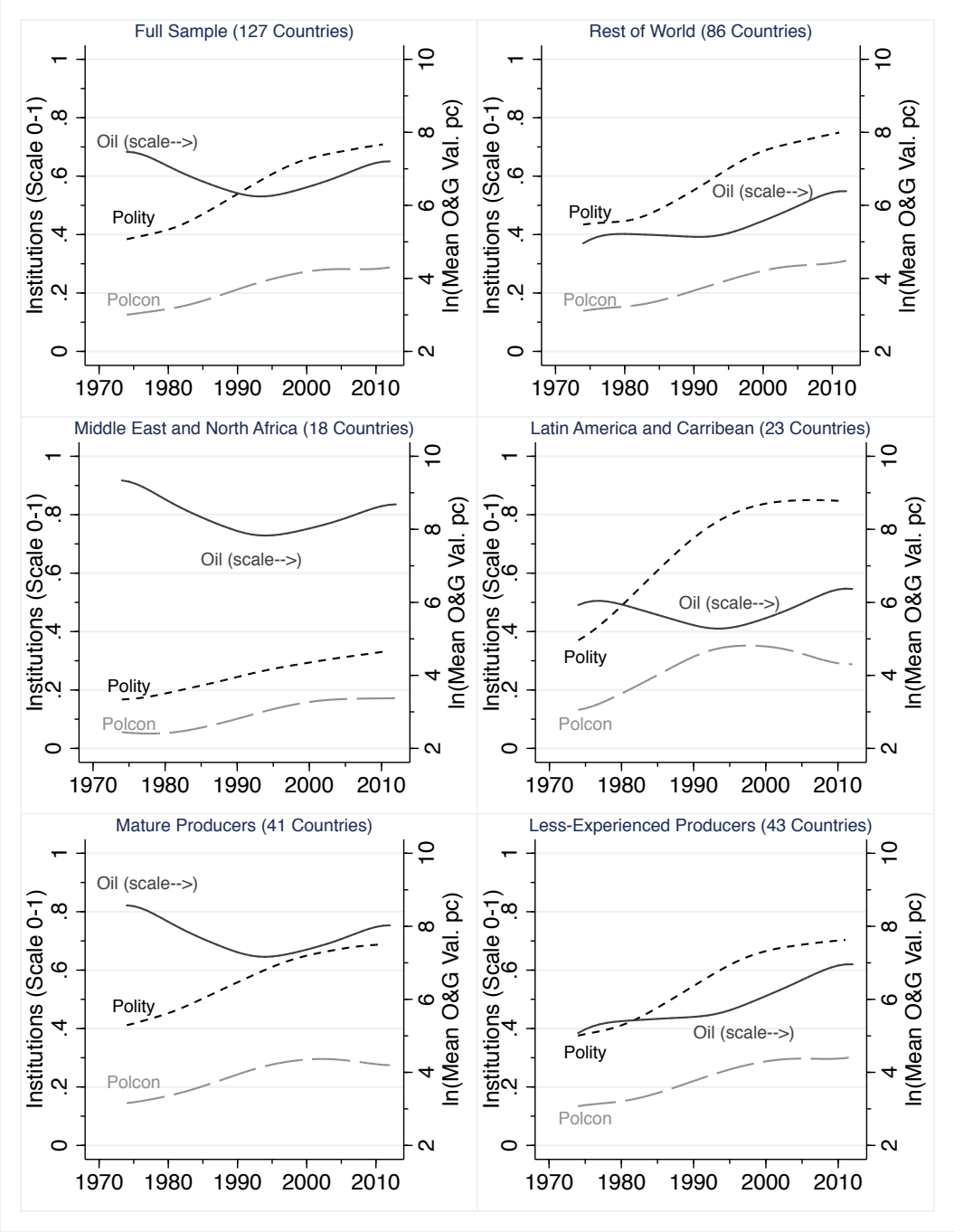

Figure 2-1 Polity, Polcon, and O&G Value p.c. Lowess Smoothed Trends (1974 – 2012)

Note: Polity rescaled to range from 0-1.
Source: Geo-Help Inc. (2011), Polcon (2012), Polity (2011), Ross and Mahdavi (2015).

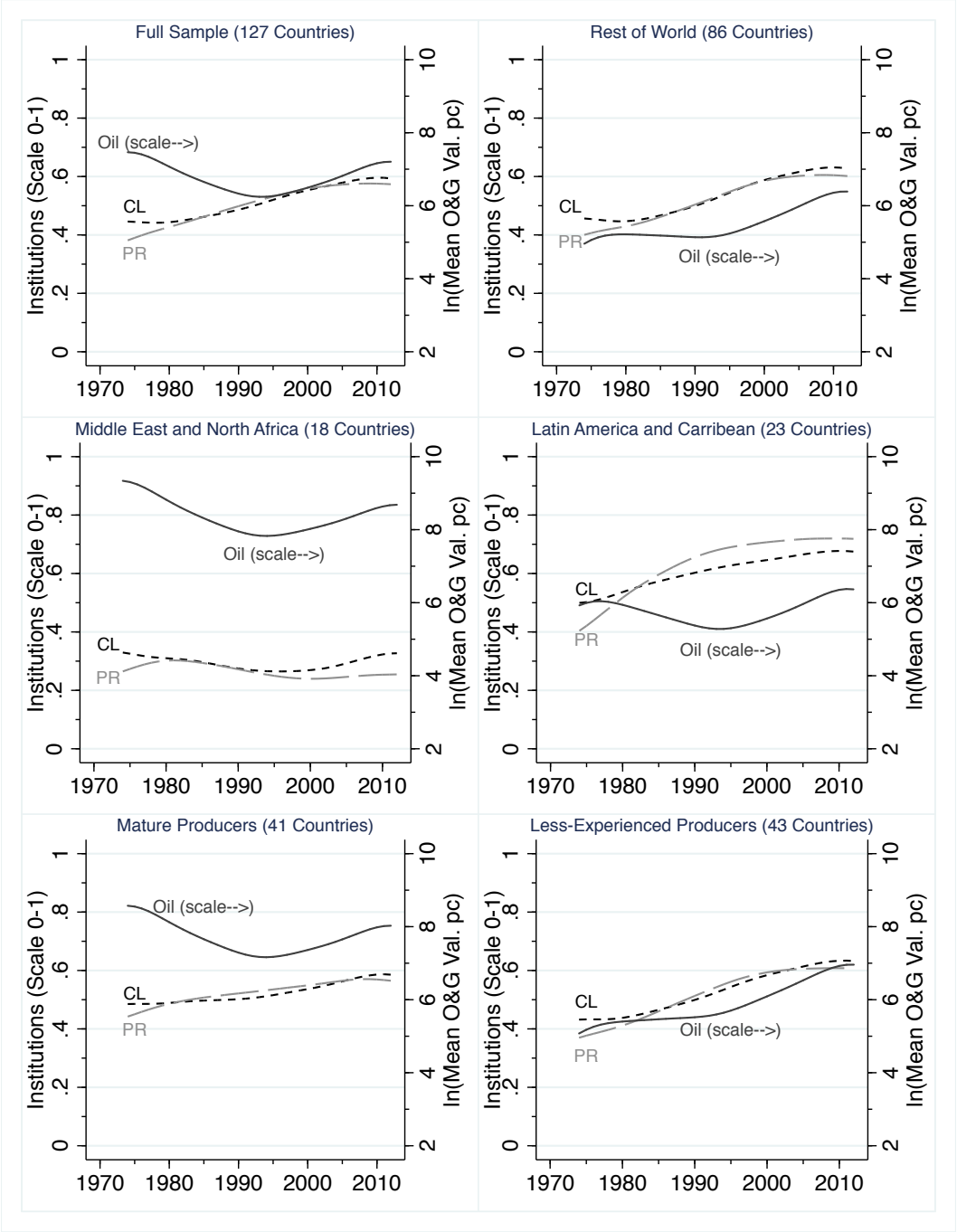

Figure 2-2 Civil Liberties, Political Rights, and O&G Value p.c. Lowess Smoothed Trends (1974 – 2012)

Note: Civil Liberties and Political Rights rescaled to range from 0-1.
Source: Freedom House (2013), Geo-Help Inc. (2011), Ross and Mahdavi (2015).

Differences between the democratic measures highlight why it is important to consider more than Polity alone. Latin America and the Caribbean provide an example. Although Polity would predict stagnant democratic change during the 2000s, Polcon would suggest it declined. Similarly, in the Middle East and North African countries, both Polity and Polcon increased throughout the period, while Civil Liberties and Political Rights largely declined until the mid-1990s.

The best visual support for a relationship between O&G Value and democratic institutions appears to be for a negative effect of O&G Value on Polcon in Latin America and the Caribbean. However, they both end the period at higher levels, which would suggest a positive relation. It is also important to remember that the mean institutional and oil variables also serve as controls. A statistical analysis is needed to identify the long-run effects of idiosyncratic changes in oil on democratic institutions, to which we now turn.

2.5.2 Statistical Analysis

Table 2-1 presents the long-run effects of O&G Value on each of the four institutional variables. The absence of a relationship is demonstrated using the MG CS-EC and MG CS-DL specifications discussed in the methods section. The column heads indicate the models used, and the full regression results for the MG CS-EC models are available in Appendix Tables A-2, A-3, A-4, and A-5). The results are consistently insignificant for the full sample and in most of the country groups. If the political-resource curse were true, certainly one would expect it show up among the producers. Yet collectively, the Mature and non-Mature groups cover the sample of producers, and even there, the effects are nil. In MENA, too, the effects are insignificant.

There is some support for a negative O&G Value-democracy relationship in the Latin America and Caribbean group, however that is somewhat unexpected. As discussed above, Latin America is thought to be an exception to the political-resource curse (Dunning 2008; Ahmadov 2014). The relationship is also not robust. It only holds at five percent significance for the MG CS-DL model, and even then, not for Polcon, which would seem to be supported by the Figure 2-2.

Table 2-1 Long-Run Effect of O&G Value pc on Democracy. Two Mean Group Models. Various Indicators and Country Groups.

	Polity		Polcon		Civil Liberties		Political Rights	
Country Group	CS-EC	CS-DL	CS-EC	CS-DL	CS-EC	CS-DL	CS-EC	CS-DL
Full	-0.040	-0.226	0.003	-0.004	0.044	0.043	-0.083	-0.051
	[-0.196]	[-1.039]	[0.323]	[-0.367]	[0.819]	[0.934]	[-0.860]	[-0.856]
Mature	0.164	-1.446	0.029	-0.000	0.268	-0.049	0.070	-0.030
	[0.093]	[-1.435]	[0.632]	[-0.004]	[0.873]	[-0.209]	[0.140]	[-0.090]
Non-Mature	-0.063	-0.056	-0.001	-0.012	0.021	0.007	-0.029	0.009
	[-0.390]	[-0.229]	[-0.067]	[-0.962]	[0.399]	[0.175]	[-0.254]	[0.130]
Latin America	-1.582	-1.921*	-0.029	-0.042	-0.326+	-0.245*	-0.510+	-0.428*
	[-1.469]	[-2.148]	[-0.385]	[-0.957]	[-1.737]	[-2.041]	[-1.837]	[-2.072]
Middle East and	-0.609	-0.145	0.000	0.000	0.067	0.050	0.032	0.101
North Africa	[-0.957]	[-0.725]	[0.006]	[0.017]	[0.582]	[0.641]	[0.198]	[0.684]
Rest of World	-0.243	-0.036	-0.006	-0.009	0.047	0.013	-0.085	-0.004
	[-1.125]	[-0.271]	[-0.511]	[-0.813]	[0.841]	[0.318]	[-1.047]	[-0.058]

Note: Mean group allows heterogeneous short- and long-run relations by country.
CS-EC – cross-sectionally augmented error correction model (Equation 3 in the text). CS-DL – cross-sectionally augmented distributed lag models (Equation 4 in the text). Oil & Gas value per capita are used in natural log form. Polity scaled from -10 (autocracy) to 10 (democracy). Polcon scaled 0-1, with increasing values indicating greater constraints. Civil liberties and Political Rights are scaled from 1 to 7, with 7 indicating greater civil liberties or political rights. Group composition presented in Table A. 7. The complete CS-EC regression results are presented in Appendix Table A. 2.
t statistics in brackets; + p<0.10 * p<0.05 ** p<.01 *** p<.001.
Source: Freedom House (2013), Geo-Help Inc. (2011), Heston et al. (2012), Polcon (2012), Polity (2011), Ross and Mahdavi (2015), World Bank (1995; 2013).

The DFE CS-EC model results are still generally statistically insignificant, even with increased estimation efficiency (by assuming the short- and long-run relations are the same across countries). Table 2-2 presents the long-run effects of oil on each institutional variable from the DFE CS-EC model. In each country group the effects are insignificant except for one. The long-

run effects are negative and significant in the Mature group. Although this result may be consistent with expectations (Tsui 2011; Omgba 2015), there are two reasons to doubt it. First it is subject to bias compared to results of the MG CS-EC model. Second, it does not persist through the robustness checks as will be shown. For Latin America and the Caribbean too, the significant relationship is no longer present. Overall, the results suggest there is no long-run relationship between the O&G Value and Polity, Polcon, Civil Liberties or Political Rights during the period 1974 - 2012. In what follows we provide several robustness checks and the cointegration results.

Table 2-2 Long-Run Effect of Oil & Gas Value pc on Democracy. CS-EC Fixed-Effects Models. Various Indicators and Country Groups.

Country Group	CL	PR	Polity	Polcon
Full	-0.012	-0.021	-0.009	-0.003
	[-0.520]	[-0.695]	[-0.114]	[-1.086]
Mature	-0.328*	-0.443*	0.001	-0.046*
	[-2.490]	[-2.454]	[0.001]	[-2.266]
Non-Mature	-0.027	-0.037	-0.017	-0.002
	[-0.905]	[-1.126]	[-0.208]	[-0.697]
Latin America	0.044	-0.331	-0.000	-0.051+
	[0.208]	[-1.153]	[-0.000]	[-1.863]
Middle East and	0.008	0.021	0.016	-0.007
North Africa	[0.350]	[0.717]	[0.011]	[-0.833]
Rest of World	-0.022	-0.023	0.006	-0.003
	[-0.807]	[-0.647]	[0.033]	[-0.807]

Note: Fixed effects models allow for heterogeneous intercepts by country, but restrict slopes to be common across countries. CS-EC – cross-sectionally augmented error correction model. Oil & Gas value per capita are used in natural log form. Polity scaled from -10 (autocracy) to 10 (democracy). Polcon scaled 0-1, with increasing values indicating greater constraints. Civil liberties and Political Rights are scaled from 1 to 7 with more 7 indicating greater civil liberties or political rights. Group composition presented in Table A. 7. The specification is based on Equation 3 in the text, but simplified to restrict the short- and long-run relations to be the same across countries.
t statistics in brackets; + p<0.10 * p<0.05 ** p<.01 *** p<.001.
Source: Freedom House (2013), Geo-Help Inc. (2011), Heston et al. (2012), Polcon (2012), Polity (2011), Ross and Mahdavi (2015), World Bank (1995; 2013).

Robustness:– The robustness tests we conduct include specification changes to the base MG CS-EC models.[14] The changes are as follows: (a) substitution of the oil measure from the natural log of oil and gas value per capita to oil and gas value as a percent of GDP, (b) changing the sample from 1974 – 2012 to post-1980 as in most of the AR results, and (c) the addition of non-oil GDP per capita as a control.[15]

We expected the results to be similar across the different tests, but with some changes. Oil and gas value as a share of GDP could be argued to be less a measure of oil abundance and more a measure of dependence, in which case, they might be expected to be more negatively associated with democratic institutions than O&G Value (natural logs of oil and gas value per capita). Second, AR argue that oil should be more negatively associated in the post-1980 period. Lastly, including non-oil GDP may affect the results because GDP per capita has a modernizing influence and could be one of the channels through which oil affects institutions. If oil reduces growth, and growth is positively related to institutional development, then controlling GDP would reduce any negative effects of oil on institutions. Specifically, our expectations are that the changes (a) and (b) would result in more negative relations, while change (c) would result in a more positive relation.

We present the results in Table 2-3. Estimates obtained from the alternative specifications are shown one change at a time. The first column reports the results from the base MG CS-EC

[14] The MG CS-EC models were used as the base model for robustness tests because the EC models are more common in the literature than CS-DL models. Nevertheless, unreported results conducting the same robustness tests using the MG CS-DL model provide similar conclusions.

[15] We previously excluded GDP per capita as a control because oil production is directly included in GDP, and because oil may also affect non-oil GDP. To account for the first problem we estimated GDP per capita excluding the portion due to oil revenues and used the adjusted non-oil measure of GDP per capita as a control. If oil also affects non-oil GDP, we may expect the relation between oil and institutions to change, which is discussed further below.

model in Table 2-1. The results from change (a) are reported in the second column and changes (b) and (c) in the third and fourth columns, respectively.

The long-run effect of O&G Value on democracy is statistically insignificant in the full sample and in each of the country groups, with a couple of exceptions. There is a significant negative relationship once again in Latin America. During the post-1980 period the negative long-run effects of O&G Value on Civil Liberties increase as expected. There are also negative long-term effects of O&G Value on Polity in the Middle East and North African countries (in post-1980 and with non-oil GDP controlled), but they are significant only at the ten percent level. Although there are a few somewhat significant results, they are not consistent across democracy variables or the robustness checks. As mentioned, the robustness tests are based only on the MG CS-EC model, however, comparable results from the MG CS-DL model support the same story.

Of all the previous results there was not one showing a significant relationship for the full sample. The negative effects in Latin America and the Caribbean are unexpected (compared to MENA, for example), and they generally do not hold using the more efficient DFE CS-EC model or under the robustness checks. The significant effects in the Mature producers when using the DFE CS-EC are supported by theory but are not robust.

Cointegration:– Cointegration testing is not necessary in the present case, but discussed for completeness. Testing is unnecessary because we did not find robust long-term effects of O&G Value on democracy. If we had, cointegration would have been necessary to assure the relationship was not spurious. That is because the regression of one non-stationary (e.g. unit-root) series on another is likely to yield a statistically significant result even for two unrelated

series. However, if a linear combination of two unit-root processes is stationary, then the variables are said to be cointegrated and the relationship is not spurious (Engle and Granger 1987). The implication is that cointegration testing should first be conducted to identify whether a long-run relationship exists. If one does exist, then the error correction models can be used to identify whether it is statistically significant and in what direction.

Table 2-3 Long-Run Effect of Oil & Gas Value pc on Democracy. CS-EC Mean Group with adjustments. Various Indicators and Country Groups.

Panel A: Polity

Country Group	Base	Oil Rent % of GDP	Post 1980	GDP Control
Full	-0.040	9.891	-0.089	0.083
	[-0.196]	[1.281]	[-0.506]	[0.300]
Mature	0.164	-0.387	-0.217	1.014
	[0.093]	[-0.751]	[-0.143]	[0.679]
Non-Mature	-0.063	14.696	0.209	-0.033
	[-0.390]	[0.823]	[0.835]	[-0.086]
Latin America	-1.582	0.635	-1.194	-1.344
	[-1.469]	[1.085]	[-1.107]	[-1.057]
Middle East and	-0.609	-2.682	-0.936+	-1.439+
North Africa	[-0.957]	[-1.295]	[-1.838]	[-1.887]
Rest of World	-0.243	9.670	-0.266	-0.089
	[-1.125]	[0.992]	[-1.179]	[-0.263]

Panel B: Polcon

Country Group	Base	Oil Rent % of GDP	Post 1980	GDP Control
Full	0.003	-0.629	-0.002	-0.025
	[0.323]	[-0.684]	[-0.203]	[-0.802]
Mature	0.029	0.047	-0.076	-0.012
	[0.632]	[0.630]	[-1.280]	[-0.131]
Non-Mature	-0.001	-1.528	-0.007	0.003
	[-0.067]	[-0.806]	[-0.386]	[0.084]
Latin America	-0.029	-0.015	-0.041	-0.016
	[-0.385]	[-0.573]	[-0.700]	[-0.135]
Middle East and	0.000	0.012	0.001	-0.042
North Africa	[0.006]	[0.412]	[0.046]	[-0.785]
Rest of World	-0.006	-0.607	0.002	0.010
	[-0.511]	[-0.761]	[0.190]	[0.427]

Table 2 3 Continued Long-Run Effect of Oil & Gas Value on Democracy. CS-EC Mean Group with adjustments. Various Indicators and Country Groups.

Panel C: Civil Liberties

Country Group	Base	Oil Rent % of GDP	Post 1980	GDP Control
Full	0.044	4.714	0.013	-0.147
	[0.819]	[1.173]	[0.276]	[-1.568]
Mature	0.268	1.288	-0.135	-0.268
	[0.873]	[1.210]	[-0.398]	[-0.645]
Non-Mature	0.021	21.075	0.078	-0.058
	[0.399]	[1.155]	[1.359]	[-0.670]
Latin America	-0.326+	0.140	-0.533**	0.017
	[-1.737]	[1.426]	[-2.599]	[0.061]
Middle East and	0.067	-0.640	0.015	-0.331
North Africa	[0.582]	[-1.002]	[0.112]	[-1.579]
Rest of World	0.047	5.720	-0.022	-0.062
	[0.841]	[1.217]	[-0.400]	[-0.603]

Panel D: Political Rights

Country Group	Base	Oil Rent % of GDP	Post 1980	GDP Control
Full	-0.083	1.915	-0.084	-0.093
	[-0.860]	[0.617]	[-0.839]	[-0.667]
Mature	0.070	0.529	0.499	-0.087
	[0.140]	[0.727]	[0.683]	[-0.155]
Non-Mature	-0.029	8.526	0.012	0.103
	[-0.254]	[0.741]	[0.111]	[0.441]
Latin America	-0.510+	-0.005	-0.431	0.064
	[-1.837]	[-0.073]	[-1.159]	[0.136]
Middle East and	0.032	1.506	0.016	0.071
North Africa	[0.198]	[0.979]	[0.090]	[0.318]
Rest of World	-0.085	2.327	-0.073	-0.117
	[-1.047]	[0.587]	[-1.024]	[-1.072]

Note: See notes from Table 1. Base model from Table 1 (MG CS-EC).
t statistics in brackets; + p<0.10 * p<0.05 ** p<.01 *** p<.001.
Source: Freedom House (2013), Geo-Help Inc. (2011), Heston et al. (2012), Polcon (2012), Polity (2011), Ross and Mahdavi (2015), World Bank (1995; 2013).

In the present case, O&G Value and each of the democracy variables are shown below to exhibit non-stationary unit-root processes in the full sample, and many of the subsamples, implying that cointegration tests would be necessary to identify a non-spurious relationship. Appendix Table A-6 presents the test results for integration order and stationarity. In most instances, the results

suggest the likelihood of unit-root processes. The first section of each panel shows the results from unit root tests of the variables in levels. They are performed using Dickey Fuller, Fisher type panel tests (Choi 2001), where the null hypothesis is that all panels contain a unit root. The second section of each panel shows the test results performed on the variables in first differences. Generally, we fail to reject unit root in levels, but reject unit root in first differences. However, there are some exceptions. For example, in the Latin America and Caribbean group, the tests show O&G Value may exhibit a unit-root process, yet the democracy variables are likely to be stationary in levels. When O&G Value and democracy are of different integration orders, it is unlikely they could be cointegrated.

There is conditional support for a long-run (cointegrating) relationship in the full sample for Polcon, Civil Liberties, and Political Rights, but not Polity. That means any significant long-run effects of O&G Value on Polity are likely to be spurious (supported by HM cointegration testing), but long-run effects of O&G Value on the other democracy variables are possible. Appendix Table A-7 presents the results of the Westerlund panel cointegration tests. Bootstrapped critical values were used to allow for cross-sectional dependence (Westerlund 2007). In the full sample, we reject no cointegration for Polcon, Civil Liberties, and Political Rights, but not for Polity. The results also vary by subgroup. The least support for a long-run relationship is in Latin America and the Caribbean where three out of four democracy variables do not appear to be cointegrated. However, three out of four democracy variables show some support for a long-run relation in the non-Mature group.

It should be noted, however, that the sample for cointegration testing was greatly reduced from 127 to 52 countries due to exclusion of countries that did not exhibit measurable change in either O&G Value or the democracy variables. Non-producers, initially full democracies, and

unchanging autocracies had to be excluded because, mechanically, no within-country relationship can exist when there is no change within country. This sample restriction should increase the likelihood of finding of a long-run relationship, suggesting the cointegration evidence should be interpreted with caution. However, as mentioned above, because we did not find evidence of long-term effects of O&G Value on democracy, support for a long-run relationship, or cointegration, is unnecessary anyway.

2.6 Comment on Recent Analysis

Illustrated by the quotes shown below, from Andersen and Ross (2014) (AR) and Haber and Menaldo (2011) (HM), these two references are essential for understanding the current debate over the existence of a political resource curse:

"The Haber–Menaldo article has had a powerful impact on the resource curse debate, calling into question widely held beliefs about the politically malignant effects of petroleum wealth" (AR, p. 994). Using the Haber and Menaldo data and models, AR showed that from 1800 to the 1970s there was no evidence of a resource curse (confirming the finding of HM) but that "since the late 1970s—the period that is the focus of most other studies—oil wealth has strongly inhibited democratization (AR, 994)."

Our primary analysis, presented above, and analysis of the valuable data prepared by HM lead us to agree largely with HM, that there was no long-run relation between oil and Polity, even for the post-1980 period. Specifically, we replicate the most convincing analysis performed by AR, Table 2, p.1006, which itself first replicated the analysis of HM. AR then expand HM's analysis by adding an interaction term between their oil measure and a post-1980 dummy variable.

The convincing rationale for the addition of the post-1980 dummy was the fact that by 1980, in most developing countries, the relationship between governments and oil companies had changed radically due to the nationalization movement during the 1970s that was prompted by the preceding jump in oil prices (1971-1974). In the AR analysis (see Table 2, Column 2 in their paper) the effect of oil on the change in Polity was positive but small prior to 1980. Post-1980, however, the effect was statistically significant and negative, because the large negative interaction term for the post-1980 period more than offsets the small positive main effect of oil. The argument seems intuitive, given that the early developers like the US have continued to rely on private oil companies and Norway was already democratic long before its oil boom. By contrast, in the countries of the Middle East and in many other developing countries, oil production was nationalized and most of the countries remained highly autocratic.

For the AR theory to be persuasive, however, their empirical finding should be robust to changes in the empirical specification. Yet, as we show in Table 2-4 below, in fact it is not. In Column (1) we first replicate the AR analysis for estimating the long-run effect of oil on Polity with the HM data set for the full period 1800-2006, including the interaction term for the post-1980 period. The results match AR's finding of a negative long-run effect of oil during the post period (Long Run Effect (Post), obtained as the sum of the main effect and interaction term divided by the negative of the coefficient on the lagged value of Polity). In Column (2), we present the results for the corresponding specification based on the post-1980 period alone, and after dropping the no longer necessary interaction term. In contrast to AR's results, the main effect of oil (Lag Total Oil Income), and hence the long-run effect, is positive and statistically

significant at the five percent level. This result is inconsistent with AR's theory, suggesting that the long-run effect of oil is not robust.[16]

Two methodological issues also warrant notice. First, for there to be a long-run relationship between Polity and oil, the two variables must be cointegrated because, as shown by, HM they are integrated variables (HM, 14). While we agree with AR that we might not expect a long-term relationship, or cointegration, over the whole period (AR, 1003), because of the structural break attributable to oil nationalization, that does not preclude the necessary cointegrating relationship for the post-1980 period alone.

Second, AR discusses that the theoretical relationship between oil and institutions is one between countries not within countries. This is to say, countries with more oil may be expected to develop democratic institutions at a different rate than those with less oil. The within-country relationship, in contrast, estimates the relationship between oil and governance institutions as they change over time within a country. While the initial research on the subject focused on the between-country relationship (e.g. Barro 1998), an important problem was recognized with this research. Between-country analysis omits country fixed effects and suffers from omitted variable bias. It is an unfortunate statistical limitation that we cannot estimate between-country relationships and at the same time also include country fixed effects.

[16] Additional results are consistent with the finding reported in Column (2) of our Table 2-4. The long-run effect of oil is not robustly negative and statistically significant even during the post-1980 period. For example, in AR's Table 2, Column (4), AR replicates HM's analysis using fiscal reliance as an alternative measure to total oil income. They again find the interaction term for the post-1980 period to be negative and significant, however, the total effect during the post-1980 period (the addition of the main effect and interaction term) is not statistically significant. We also replicated the AR analysis in Tables 4 and 5 using the post-1980 period alone, and similarly found the effect of total oil income on Polity was not negative and statistically significant. These results are available on request.

Table 2-4 Replication of Andersen and Ross (2014) Table 2, Column 1 And Sample Adjustment Long-Run Effects on Polity

	(1)	(2)
	DKSE	DKSE Post80
Long Run Effect (Post)	-1.140*	0.752*
	[-2.033]	[2.642]
Lag Polity	-0.087***	-0.157***
	[-11.613]	[-5.488]
Lag Total Oil Income	0.045*	0.118*
	[2.035]	[2.507]
Lag Total Oil Inc. X Post	-0.144***	
	[-3.748]	
Δ Total Oil Income	-0.023	-0.163
	[-1.008]	[-1.517]
Δ Total Oil Inc. X Post	-0.340***	
	[-3.457]	
Lag log(GPD pc)	-0.276	-2.313***
	[-0.870]	[-4.538]
Lag Civil War	0.063	-0.252
	[0.140]	[-0.363]
Lag Reg. Democracy	0.025***	0.045*
	[3.411]	[2.610]
Lag World Democracy	0.059*	0.657***
	[2.048]	[6.910]
Δ log(GPD pc)	1.322	2.013
	[0.762]	[0.863]
Δ Reg. Democracy	0.375***	0.464***
	[5.368]	[4.538]
Δ World Democracy	-0.278*	1.482***
	[-2.568]	[6.300]
Constant	2.552	0.000
	[1.358]	[.]
Total Observations	10195	3891
Number of Countries	163	163

Note: Same model as used in Andersen-Ross (2014). Dependent variable: Δ Polity. Driscoll Kray standard errors are used to allow for cross-sectional dependence. t statistics in brackets; * p<0.05 ** p<.01 *** p<.001.
Source: See Haber and Menaldo (2011).

2.7 Conclusion

We find no robust long-run effect of oil abundance on democratic institutions using four different indicators associated with democracy (Polity, Polcon, Civil Liberties, and Political Rights), estimating our model using different methods and samples, including non-oil GDP in our model, restricting the sample to the post-1980 period, and considering oil and gas value both as a share of GDP and per capita. Our results are consistent with Haber and Menaldo (2011), but contrast evidence supporting a negative relation, Andersen and Ross (2014) (AR) and Ahmadov (2014) being the most notable. The meta-study Ahmadov (2014) finds the overall effect of oil on democracy to be small, negative, and significant, but with considerable heterogeneity across regions - somewhat more negative among countries of the Middle East and North Africa but positive and highly significant in Latin America. The present study does not find robust evidence for long-term (within country) effects of oil in Latin America, MENA, among Mature producers, or non-Mature producers. There is some support for a negative relationship in Latin America and the Caribbean and the Mature producers, but the results are not robust.

We expanded the empirical work done by Haber and Menaldo (2011) (HM) to include different aspects of democracy: checks on the executive (Polcon), Civil Liberties and Political Rights, and also to use the most updated time-series econometric methods. Like HM, the regressions separately estimated long-run effects from short-run, but our models also allowed for country-relationship heterogeneity, corrected for correlation across countries, and used an alternative model that is better suited for persistent dependent variables like democracy. In general, the results from the different models were insignificant. Moreover, the cointegration results support only conditional evidence of a long-term relationship between O&G Value and

the democracy measures. We also replicated the results from AR and show that a simple change to their model challenges the robustness of their findings.

It is important to note that, although we are unable to identify robust long-run negative effects of O&G Value on democracy within countries on average, it may still be the case that oil has significant negative effects in individual countries. AR also points out that the oil curse theory is about between-country levels of oil. However it is difficult to test this theory. Unfortunately, between-country analyses omit important characteristics including informal institutions (for example). Country case studies, that investigate both the dynamics of the oil industry and the development of political institutions, may be necessary to further inform this debate.

Last, regional democratic development is statistically significant, positive, and robust. Although not discussed in body of the paper, this result is shown by the coefficient on the cross-sectional mean on each of the institutional variables (Appendix Tables A-2 – A-5), and replicated in each model variant. The models are not simply underpowered or unable to consistently identify a robust relationship. The cross-sectional means pick up the positive trend in democratic development occurring around the world.

Chapter 3 Who Suffered Most From the Great Recession? Happiness in the United States

3.1 Introduction

The Great Recession ("Recession") was the most severe recession in the United States since the Great Depression. Annual GDP per capita growth was negative during the years 2008 and 2009 (World Bank 2015). The annual unemployment rate reached its highest levels since 1982 and remained above 7.0 percent until 2014 (BLS 2015a). The median house price declined by 12.6 percent from 2007 – 2009 and had still not recovered by 2012 (Census 2015). Each measure represents a significant negative shock to the American people, but how were they affected? Did some population groups fare better than others, and can we explain why? To answer these questions, I provide evidence from nationally representative surveys, from the General Social Survey (GSS), of self-reported evaluations of one's life, commonly referred to as subjective well-being (SWB) or more simply, happiness. Data from the GSS Panel (2006-2014), which tracks the same individuals over time, was also used to supplement the main analysis.

In economics, the well-being impacts of past business cycles have been most commonly measured in terms of economic growth, unemployment, and inflation (e.g. the misery index), but in more recent years there has been a growing interest in measures of SWB (Stiglitz et al. 2009). SWB may be better placed than more traditional economic metrics for this purpose. For example, Lucas (1987) argues that business cycles are not very important when considering their effects on aggregate consumption. In response, Wolfers (2003) uses SWB and finds macroeconomic volatility to have 'moderate but important' effects on well-being. Wolfers (2003), and others focusing on SWB, contribute to the economics of happiness, which is a relatively new area of research but one that is becoming increasingly important.

This study is the first to document the SWB impacts of the Great Recession, measured as deviations from long-term trends, disaggregated by population group, and to provide statistical evidence for the mechanisms affecting happiness in the United States during this period. To understand the effects of the Recession, estimates of group-specific deviations from group-specific trends are necessary for two reasons. First, the happiness trends are generally negative, but not strictly. They vary especially by race and gender (Blanchflower and Oswald 2004; Stevenson and Wolfers 2008b, 2009 and 2012; Herbst 2011). Second, different population groups report different average happiness levels, and as different trends suggest, they are subject to different long-term forces that may have persisted through the Recession.

In addition to the varying trends in happiness, the results show each population group reported significant declines during the Great Recession. For the population as a whole, 2010 marks the lowest level of reported happiness in the United States since consistent measurement began in the 1970s. The declines during 2010 vary substantially however. The foreign-born, who were the greatest impacted, reported a decline more than three times greater than the full population. Men were impacted more than women, young adults less than people older than 24, and Hispanics more than non-Hispanics. Comparison with the 1980s recession shows that the duration of the Great Recession's well-being impacts was longer, but that the 1980s' impact was deeper. The 1980s' depth is partially explained by a greater decline in women's happiness, however, the overall mechanisms are not yet well understood. In contrast, the declines reported in 2010 can be statistically explained by declining income and rising unemployment. The large decline reported by the foreign-born in 2010 is not surprising when considering they reported declines in both income and employment that were each among the largest for the groups studied. The conclusion that declining income best explains the declines in happiness during the

Great Recession is further supported by robustness checks, including panel analysis with individual fixed effects.

The results suggest recessions have a large impact on well-being (cf. Lucas 1987), and the mechanisms are not surprising. Declining family income affects consumption, the ability to meet financial obligations, and has many indirect effects. Unemployment similarly has many consequences, not only through income, but also large non-pecuniary effects. Counter-cyclical income and employment support may be the most effective for mitigating the well-being effects of future recessions, and policy makers may want to target certain populations.

3.2 Evidence From Past Literature

A review of the past evidence points to income and unemployment as key variables to account for the Great Recession's impact. Two closely related studies, Graham et al. (2010) and Deaton (2011), each show unemployment and income measures (including stock prices) are correlated with SWB during the Great Recession in the United States. Unemployment, short-term changes in income, and to a lesser extent inflation have been consistently shown to be related to SWB in a broad context (di Tella et al. 2001 and 2003; Stevenson and Wolfers 2008a; Easterlin et al. 2010; Diener et al. 2012; Dolan et al. 2008; and Winkelmann and Winkelmann 1998), and during economic crises (Wolfers 2003; Bjørnskov 2014; Arampatzi et al. 2015). Thus the expectation is that the Great Recession directly reduced SWB through increased unemployment and reduced income.

What other factors might be important, and were there any that mitigated the income and employment shocks? There is some evidence that welfare-state policies mitigated the effects. Morgan (2015) shows that greater net income replacement rates reduced the SWB declines

reported by European nations during the Great Recession, and generous labor market policy helps to reduce the negative association between SWB and unemployment (Carr and Chung 2014; Wulfgramm 2014). However, not all policies are beneficial. Morgan (2015) shows employment protection legislation exacerbated the well-being effects of the Great Recession in Europe, and Bjørnskov (2014) shows "that wellbeing losses during crises are substantially larger in countries with tighter regulations of credit, labour or product markets (Bjørnskov 2014, 175)." Concerning different population groups, young adults are expected to be affected more by recessions (Bell and Blanchflower 2011). Better-educated people and married people are happier than their counterparts (Dolan et al. 2008) and they may have also fared better through additional support or better coping mechanisms. In contrast, parents are less happy in the United States (Herbst and Ifcher 2014), and this association may have increased during the Recession through additional income needs or concern for their children's future.

The most closely related studies, Graham et al. (2010) and Deaton (2011), provide some helpful insight, but comparability is limited. As mentioned, they point toward income and unemployment as potential channels, and similar to the present study, each shows SWB declining from early 2008 into 2009. However, they show SWB trending upward beginning in 2009, and recovery by the end of 2009 for Graham et al. (2010) and 2010 for Deaton (2011). In contrast, SWB does not recover until 2012 in the present study. This difference can be explained primarily by different benchmarks. They measure recovery to the early 2008 SWB levels, while I measure recovery to long-term trend levels, and 2008 was below trend.

What is more important for comparison, the data used in Graham et al. (2010) and Deaton (2011) have limitations. Both papers use SWB data from the Gallup Healthways Well-Being Index, which is a daily survey beginning in 2008. The first limitation relates to the daily

survey, which may be overly sensitive to day-to-day events, some that may be important, and "some that have only dubious implications for well-being (Deaton 2011. 23)." Second, the Gallup SWB data are biased downward by the presence and placement of political questions in the survey that also varies over the study period. Deaton (2011) implements corrections for the political question bias, but the analysis depends on the corrections' validity. Last, their analyses are necessarily limited to focus on short-term relationships because the survey begins in 2008. Free from the limitations associated with Gallup's daily data, the present analysis is better placed to address the effects of the Great Recession on happiness in a long-term context.

3.3 Happiness Data and Methods

The General Social Survey (NORC 2015) is the primary source of happiness data for time-trend analysis in the U.S. In 30 waves it covers the 42-year period from 1972 – 2014. The survey collects demographic, economic, and attitudinal information for more than 1500 people per wave. Unlike daily surveys, the waves are fielded over a period of several months (typically February – April). It should be noted, however, that there have been changes that could affect time trends (i.e. sample composition), but consistent with the past literature, population weights were applied and problematic samples dropped (e.g. 1972).[17] The GSS measures happiness as the response to the question, "Taken all together, how would you say things are these days–would you say that you are very happy, pretty happy, or not too happy?" This happiness question represents one of many SWB questions. Similar to life satisfaction, it is more evaluative in nature.

[17] See Appendix B for a discussion of the population weights and which samples have been dropped.

The impacts of the Great Recession were estimated as group-specific deviations from group-specific long-term trends, using individual-level happiness regressions, with repeated cross-sectional data from the GSS. Each regression has two population groups that were selected based on fixed characteristics.[18] Deviations in happiness were estimated for women compared to men, African Americans compared to whites and other races, young adults ages 18-24 (also referred to as youth) compared to older people[19], foreign-born compared to native-born, and non-white Hispanics compared to non-Hispanics. The regressions use dummy variables for the years 2008 and 2010 (referred to as "Recession dummies"), fixed characteristics (e.g. birth-cohort), group indicators, a linear trend, a dummy variable for past recession years, and group interactions with trend and the Recession dummies, to obtain group-specific trends and deviations-from-trend. By excluding additional control variables, the Recession dummies capture the full short-term impacts of the Great Recession and any additional effects experienced during 2008 and 2010. This model is referred to as the base model and will be built upon in subsequent analysis. The particular estimating equations and control variables are listed in the table footnotes (presented in ordinary least squares form "OLS" for simplicity).

Consistent with the past literature, the regressions are performed using an ordered probit specification to account for the ordinal nature of the happiness data (e.g. Stevenson and Wolfers 2009; Ifcher and Zarghamee 2014). Unlike OLS, ordered probit regressions do not make the

[18] Based on fixed characteristics, the group composition should remain the same over time. Selective migration could still affect the group composition, especially for the foreign-born, but if we assume those affected most during the Recession were the most likely to move, then the Recession's impacts were understated not exaggerated.

[19] Identification of the effect of being a youth during the Recession depends on the birth-cohort variables. The youngest birth-cohort is defined as those born in 1986 or later (1986-cohort), and in 2010, the entire youth group belongs to the 1986-cohort. As a consequence the youth variable interacted with 2010 is directly collinear with this birth-cohort variable in 2010, and identification relies on the 1986-cohort variable's association in alternative years (2004, 2006, 2008, 2012, and 2014). To determine if identification for the effect of being a youth during 2008 and 2010 is a problem (in 2008 youth belong to two cohorts), I estimated the same specification for youth without including the birth-cohort variables, and found similar results. The sample sizes and five alternative years provide sufficient variation for consistent identification.

assumption that people treat the difference between "very happy" and "pretty happy" the same as the difference between "pretty happy" and "not too happy."[20] Ordered probit regressions estimate the probability of each response category as a discrete ordered choice. The resulting coefficients, however, do not apply linearly. So to ease interpretation of the results, I also provide the marginal effects for the probabilities of responding "very happy", which are locally linear and can be interpreted like OLS coefficients. A marginal effect also shows the total effect for a group (i.e. it includes the main effect and interaction term for the group of interest).

The paper focuses on explaining the declines in reported happiness in 2010. The GSS was not conducted in 2009, and the 2008 survey was fielded prior to much of the Recession's effects.[21] Although the Recession officially began in December of 2007, much of the economic decline occurred later. The collapse of Lehman Brothers, the largest bankruptcy in U.S. history, occurred on September 15, 2008. The largest percentage decline in GDP occurred from the third quarter 2008 to the fourth quarter 2008 (BEA 2015a). The official unemployment rate did not exceed 7.0 percent until December 2008, where it remained until December 2013 (BLS 2015b). For this reason, the happiness figures for 2008 are presented along with 2010, but the discussion focuses on 2010.

It is important to note that self-reported income used throughout the paper is total family income, from all sources, before taxes, not conditional on employment, and adjusted for inflation and household size. Previous researchers using the GSS have also used family income (e.g. Stevenson and Wolfers 2009; Ifcher and Zarghamee 2014), because missing values for

[20] A further discussion of this approach can be found in Ferrer-i-Carbonell and Frijters (2004).

[21] The 2008 General Social Survey was fielded between April and September. Although the Recession officially began in December of 2007, by the time of fielding, the self reported economic factors had not changed significantly. The unemployed population share had only increased slightly (2008: 3.4 percent, 2006: 3.3 percent), and self-reported real family income, per household equivalent, had not significantly declined (2008: 33,826, 2006: 33,776). Note the GSS based unemployment information is for unemployed people as a percent of the total population not the labor force.

individual income greatly exceeds those for family income (40 percent compared to 10 percent). Analysis using personal income is discussed in the robustness section and shows the main result does not depend on income measures.

3.4 Description of Well-Being Impacts

A smaller share of Americans report being "very happy" today as compared to the early 1970s, and the lowest recorded share is for the year 2010. Although the Great Recession officially ended in 2009 (NBER 2014), happiness did not recover to pre-period trends until 2012. Figure 3-1 illustrates the negative trend, the low mean score in 2010, and the subsequent recovery.

3.4.1 Statistical Significance of Declines by Population Group

The size of the declines during the Recession, and how they compare across groups, is summarized in Table 3-1, based on the results in Table 3-2 discussed below. Each group is statistically less likely to report being "very happy" during 2008 and 2010, and the declines are usually statistically greater in 2010. The foreign-born were greatest impacted. With a 15.1 percentage point reduced probability of reporting "very happy" in 2010, they reported a substantially larger decline than the full sample, which reported a corresponding decline of 4.6 percentage points. The next largest decline, 8.9 percentage points, was for Hispanics, which is not surprising because more than one third are foreign-born. In contrast, youth (ages 18-24) reported the smallest decline of only 2.1 percentage points, even though they were expected to be one of most affected groups (e.g. Bell and Blanchflower 2011). Compared to their reference groups, men reported a statistically greater decline (in 2010), and so did: blacks (2008), non-youth (2010), foreign-born (2008 and 2010), and Hispanics (2008 and 2010).

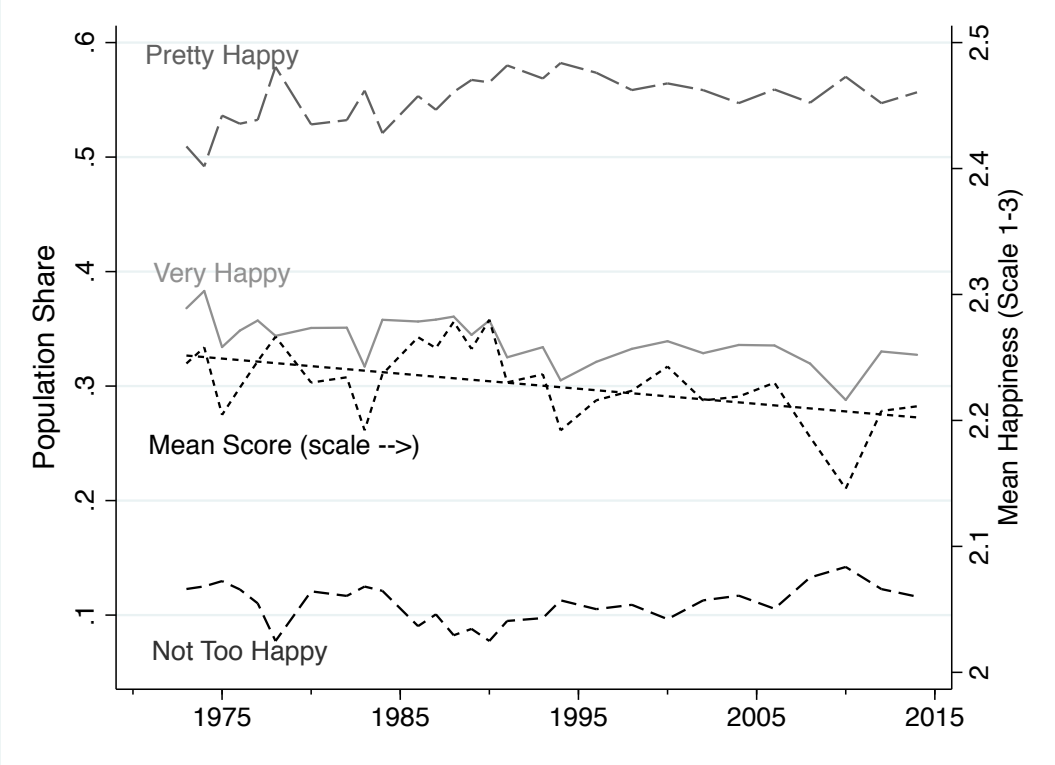

Figure 3-1 U.S. Happiness 1973 – 2014. Annual Proportions Reporting Very Happy, Pretty Happy, or Not Too Happy

Source: NORC, General Social Survey (Release 2, April 17, 2015)
Notes: Happiness Scored: Very Happy = 3, Pretty Happy = 2, Not Too Happy = 1
No controls, sample weights and adjustments applied, see paper for details.

The statistical significance of differences between groups is obtained from the group interactions in the ordered-probit-regression results presented in Table 3-2. For example, the coefficient on "2010 X Group" in column 3 provides an estimate of blacks' experience in 2010 relative to whites and other races, and in this instance, blacks do not experience a statistically significant difference. The row labels for "Group" refer to the group listed in the column head (i.e. in column 2 women are the main group while men are the omitted group). "Year 2008" should be interpreted as the deviation from "Trend" for the omitted group. The 2010 decline for a specified group (reported in table 3-1) is the non-linear combination of "Year 2010" and "2010 X Group."

Table 3-1 Deviations from Long-Term Trends; Marginal Effects by Group from Ordered-Probit Regressions with Happiness as the Choice Variable. Probability of Reporting Very Happy, 1973 – 2014.

Panel A	Full Sample	Women	Men	Black	White and Other
2008	-0.020***	-0.010*	-0.031***	-0.087***	-0.011***
	[-5.312]	[-1.739]	[-3.181]	[-7.953]	[-3.082]
2010	-0.046***	-0.032***	-0.062***	-0.034***	-0.048***
	[-12.245]	[-5.000]	[-5.799]	[-2.965]	[-13.208]
Trend	-0.002***	-0.003***	-0.002**	0.000	-0.003***
	[-3.310]	[-4.072]	[-2.019]	[0.471]	[-3.707]
Difference in Year Effects					
2008-2010	0.026***	0.022***	0.031***	-0.053***	0.037***
	[47.215]	[18.374]	[25.309]	[25.970]	[56.150]

Panel B	Youth	25 and Older	Foreign-Born	Native-Born	Hispanic	nonHispanic
2008	-0.023**	-0.020***	-0.068***	-0.014***	-0.076***	-0.014***
	[-2.348]	[-5.026]	[-5.271]	[-3.489]	[-4.951]	[-4.008]
2010	-0.021*	-0.049***	-0.151***	-0.031***	-0.089***	-0.036***
	[-1.834]	[-13.177]	[-9.810]	[-7.476]	[-5.113]	[-8.329]
Trend	-0.002**	-0.002***	0.001	-0.003***	0.003	-0.005***
	[-2.346]	[-3.286]	[0.536]	[-3.496]	[1.033]	[-4.335]
Difference in Year Effects						
2008-2010	-0.002	0.030***	0.083***	0.017***	0.013**	0.023***
	[0.378]	[33.586]	[21.850]	[29.906]	[2.178]	[19.804]

Source: Author's calculations based on data reported in text.
Notes: Marginal Effects, probability of reporting "very happy", are estimated from corresponding regressions in Table 2. The two other reporting categories are: "pretty happy", and "not too happy". Nativity data are available beginning in 1977. Hispanic data are available beginning in 2000.
t statistics in brackets (clustered by year); * $p<.10$ ** $p<.05$ *** $p<.01$.

The results for the foreign-born and youth may be surprising, but self-reported declines in income and employment provide plausible explanations. Data from the GSS (reported in Appendix Table B-3) show the foreign-born experienced both a substantial decline in income (21 percent from 2006 to 2010) and increase in unemployment (5.2 percentage points). Youth, in

contrast, reported the smallest increase in unemployment from 2006 to 2010 at 1.8 percentage points. Youth also reported a large decline in income, but as mentioned, income is measured as total family income, and it is not clear whom youth are including in "family" income. Moreover, Graham et al. (2010) also states young people (19-35) responded less to events during the Recession than older people.

3.4.2 Statistical Significance of Observed Trends in Happiness

Although the focus is on the Great Recession, a few of the long-term trends warrant notice. The first is for women, who report declining levels of happiness in both absolute terms and relative to men. The absolute trend is shown in Table A-1 by the "Trend" marginal effect. Specifically it means that the probability of women reporting "very happy" declined on average by 0.3 percentage points per year over the period 1973 – 2014.[22] Given the host of improvements in objective indicators for women, it may be surprising that the decline was greater than for men (shown by the negative and statistically significant "Trend X Group" coefficient in Table 3-2, column 2). Comparable results and potential explanations are discussed in Stevenson and Wolfers (2009) and Herbst (2011).

During this period, most groups report a negative trend, however that is not true for blacks, foreign-born, and Hispanics. In the present study blacks report a positive, though statistically insignificant trend, and past studies have shown a significant-positive trend. The difference is likely because the present study extends the analysis from 2008 to 2014 (c.f. Stevenson and Wolfers, 2012), and the trend has flattened out in recent years. Significant or not, a positive trend in the U.S. is unusual. Blacks' long-term trend has been discussed in the

[22] On average women are approximately 12.3 percentage points less likely to report being "very happy" in 2014 than they were in 1973.

literature (Stevenson and Wolfers 2008b, and 2012), while the trends for the foreign-born and Hispanics should be the subject of future research.

Table 3-2 Deviations from Long-Term Happiness Trends; Group Ordered-Probit Regressions. Choice Variable Happiness, 1973 – 2014.

Group	Full Sample	Women	Black	Youth	Foreign-Born	Hispanic
	(1)	(2)	(3)	(4)	(5)	(6)
Women	0.072***	0.150***	0.072***	0.072***	0.060***	0.023
	[4.047]	[4.928]	[4.051]	[4.050]	[3.334]	[0.817]
Black	-0.328***	-0.328***	-0.513***	-0.329***	-0.298***	-0.225***
	[-10.403]	[-10.409]	[-8.520]	[-10.428]	[-10.197]	[-6.580]
Youth	-0.107***	-0.106***	-0.108***	-0.105**	-0.109***	-0.147**
	[-3.856]	[-3.804]	[-3.876]	[-2.413]	[-3.374]	[-2.388]
Group					-0.250***	-0.871***
					[-4.649]	[-2.802]
Past Recession	-0.049**	-0.049**	-0.049**	-0.049**	-0.055*	-0.077***
	[-2.130]	[-2.164]	[-2.110]	[-2.125]	[-1.826]	[-5.408]
Trend	-0.007***	-0.005**	-0.007***	-0.007***	-0.008***	-0.014***
	[-3.304]	[-2.014]	[-3.698]	[-3.284]	[-3.493]	[-4.283]
Year 2008	-0.055***	-0.086***	-0.029***	-0.054***	-0.039***	-0.037***
	[-5.358]	[-3.209]	[-3.095]	[-5.062]	[-3.503]	[-4.067]
Year 2010	-0.126***	-0.172***	-0.128***	-0.134***	-0.085***	-0.099***
	[-12.491]	[-5.887]	[-13.432]	[-13.384]	[-7.535]	[-8.594]
Trend X Group		-0.004**	0.009***	-0.000	0.010***	0.024***
		[-2.298]	[4.117]	[-0.095]	[4.989]	[2.578]
2008 X Group		0.059	-0.256***	-0.012	-0.154***	-0.184***
		[1.544]	[-7.932]	[-0.411]	[-4.451]	[-4.041]
2010 X Group		0.086**	0.016	0.074**	-0.344***	-0.160***
		[2.025]	[0.445]	[2.215]	[-8.663]	[-2.911]
Observations	32945	32945	32945	32945	28803	11371
R2 (psuedo)	0.010	0.010	0.010	0.010	0.009	0.008

Source: Author's calculations based on data reported in text.
Notes: Omitted groups are: men, white and other races, ages 25 and older, native-born, and non-Hispanics. Additional control variables include age, age squared, ten-year birth-cohort, and mother's and father's education. The estimated regression (specified in OLS) is: $happy_{igt} = \alpha_0 + \boldsymbol{\beta}'\boldsymbol{x}_{it} + \delta preces_t + \boldsymbol{\lambda}_0'\boldsymbol{time}_t + \boldsymbol{\lambda}_1'\boldsymbol{time}_t\ X\ group_2 + \varepsilon_{igt}$. $happy_{igt}$ is reported happiness for individual i belonging to one of two groups g in year t; $\boldsymbol{x}_{it}$ is a vector of individual characteristics; $preces_t$ is a dummy variable for past recessions; $\boldsymbol{time_t}'$ is the vector (1 $trend_t$ d_{08} d_{10}), where $trend_t = year_t - 1972$ and d_t are dummy variables for the years 2008 and 2010; $group_2$ is a dummy variable for the demographic group of interest. The coefficients of vector $\boldsymbol{\lambda}_0$ are the main effects common to all groups, and the marginal effects are obtained from the nonlinear combination of the main effect and the interaction coefficient (i.e. $\boldsymbol{\lambda_0}$ and $\boldsymbol{\lambda_1}$). Nativity data are available beginning in 1977. Hispanic data are available beginning in 2000.
t statistics in brackets (clustered by year); * p<.10 ** p<.05 *** p<.01.

3.5 Great Recession Channels – Explaining the Impacts

Declines in income and employment provide plausible explanations for the declines in happiness reported during the Great Recession, but were other factors important? Did GDP per capita or the aggregate unemployment rate affect happiness beyond their direct effects on individual income and employment? Were other individual characteristics important? What about housing prices? The following sections identify the plausible channels through which the Great Recession operated, and the statistical methods to obtain the results.

3.5.1 Methods and Variables to Identify Plausible Channels

To identify plausible channels, regional and quarter-of-interview controls, personal characteristics, macro variables, and interactions with certain micro controls are sequentially added to the base model. As mentioned, the base model incudes fixed-individual characteristics, a dummy for past recessions, a linear trend, group indicators, Recession dummies, and interactions to obtain group-specific deviations from long-term trends. The additional control variables include traditional micro characteristics that affect happiness (Dolan et al. 2008) and certain macro-economic variables. In particular the macro pathways include: log GDP per capita and lagged log GDP per capita, the unemployment rate, log median house price, the inflation rate, income inequality (Gini coefficient), and government assistance (social expenditures). Lagged log GDP per capita is included because GDP per capita and GDP per capita growth have both been shown to be important variables in the literature, and adding both log GDP per capita and its lag is statistically more flexible than GDP per capita or GDP per capita growth separately. In this context, the unemployment rate could be interpreted as affecting feelings of job security,

because controls for individual employment status are also included. Income inequality could be interpreted as affecting trust and feelings of fairness (Oishi et al. 2011). GDP and the unemployment rate were measured at the census division level, the median house price at the census region, and the others at the country level. The specific variables and their sources are detailed in the Appendix Table B-4.

When adding control variables, if the statistical significance of a Recession dummy is reduced, then the added variable helps account for the previously unidentified effects associated with the Recession years. In the next step, key micro-control variables are interacted with the Recession dummies. Interactions are important because they allow for the relationships of the interacted variables to change during the Great Recession. The relationships could change because people's preferences change, the economic and social context changed, and because the source of variation is likely due to the Great Recession. With interactions the original Recession dummies (main effects) capture only the remaining variation during that year that is not associated with that channel.

The sample has been restricted to people reporting family income, employment status, and each of the micro characteristics of interest. Nativity in particular affects the sample because it was not added to the GSS until 1977. The Gini coefficient also limits the period to 2012 because it was not available for 2014 at time of writing. The analysis based on Hispanic origin is restricted further to the period beginning in 2000, because Hispanic origin was not available before. The base model used to describe the initial declines is an exception. It uses the longest period available, from 1973 – 2014, for each group except those based on nativity and Hispanic origin.[23]

[23] If sample period is a concern, there are two models that retain the same main conclusions with adjusted sample periods. First, the base model with added location and quarter of interview controls, uses the period 1977-2012, and

As with the descriptive analysis the regressions are conducted using an ordered probit specification, and the particular estimating equations are listed in the table footnotes (presented in OLS form for simplicity). In what follows the analysis is first performed for the population as a whole, including robustness checks. Then group specific deviations are estimated as outlined earlier.

3.5.2 Plausible Channels – Average Relationship For Full Population

The primary mechanisms affecting happiness during the Great Recession are income and unemployment. The results are based on Tables 3-3 and 3-4. Table 3-3 presents the first set of results with sequentially added controls, and Table 3-4 further adds micro-control Recession interactions. Adding micro controls, especially income, labeled ln(Eqv. Inc.), and employment status, reduces the decline reported by the population as a whole, and is enough to reduce the significance of past recessions, though not the Great Recession. The interactions with the Recession dummies are necessary to statistically account for the Great Recession's effects – discussed below with Table 3-4. The common trend can be statistically accounted for by adding marital status. This result makes sense as marriage is positively associated with happiness, and the married-population share declined over the period from approximately seventy to fifty percent (shown in the Appendix Table B-1).

In general, the coefficients in Table 3-3 are in the expected direction and statistically significant. Women are happier; blacks less happy; higher education is positively associated with happiness; and republicans, religious people, married couples, and non-parents are all happier.

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shows similar deviations during 2008 and 2010 (in Table 3-3). Second, the base model with added controls, but excluding nativity and the Gini coefficient, to retain the period 1973-2014, provides similar explanations (discussed in the robustness section).

Table 3-3 Ordered-Probit Regressions for Full Sample with added Micro and Macro Controls, 1977 – 2012.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Year 2008	-0.055***	-0.114***	-0.109***	-0.126***	-0.123***	-0.125***	-0.170***	-0.148***
	[-5.045]	[-5.913]	[-5.707]	[-6.838]	[-6.562]	[-7.556]	[-5.575]	[-6.138]
Year 2010	-0.126***	-0.150***	-0.143***	-0.147***	-0.145***	-0.116***	-0.076**	-0.066**
	[-11.650]	[-9.098]	[-8.736]	[-8.536]	[-8.350]	[-7.407]	[-2.155]	[-2.322]
Trend	-0.007***	-0.011***	-0.011***	-0.007**	-0.007**	-0.006*	-0.002	-0.000
	[-3.120]	[-3.432]	[-3.365]	[-2.162]	[-2.107]	[-1.867]	[-0.418]	[-0.013]
Past Recession	-0.054*	-0.068**	-0.065**	-0.055	-0.055	-0.047	-0.039*	-0.022
	[-1.818]	[-2.100]	[-2.143]	[-1.551]	[-1.548]	[-1.393]	[-1.902]	[-0.956]
Women	0.060***	0.044**	0.050***	0.078***	0.082***	0.094***	0.093***	0.093***
	[3.314]	[2.514]	[2.795]	[3.582]	[3.727]	[4.527]	[4.505]	[4.507]
Black	-0.299***	-0.303***	-0.236***	-0.164***	-0.153***	-0.126***	-0.127***	-0.128***
	[-10.151]	[-8.929]	[-6.403]	[-4.089]	[-3.874]	[-3.243]	[-3.247]	[-3.245]
Youth	-0.110***	-0.084**	-0.043	0.047	0.041	0.048	0.046	0.046
	[-3.409]	[-2.286]	[-1.259]	[1.202]	[1.065]	[1.204]	[1.155]	[1.160]
Foreign	-0.024	-0.025	-0.046	-0.076*	-0.075*	-0.064	-0.063	-0.063
	[-0.647]	[-0.631]	[-1.143]	[-1.872]	[-1.846]	[-1.593]	[-1.579]	[-1.576]
High School and Less			-0.086***	-0.094***	-0.090***	-0.065**	-0.064**	-0.065**
			[-2.588]	[-2.872]	[-2.797]	[-2.029]	[-2.018]	[-2.015]
Bach. Deg. +			0.131***	0.109***	0.104***	0.072**	0.073**	0.073**
			[3.537]	[2.984]	[2.866]	[1.972]	[2.026]	[2.019]
Republican			0.037***	0.031***	0.031***	0.028***	0.028***	0.028***
			[6.686]	[5.554]	[5.643]	[5.160]	[5.150]	[5.149]
Religious			0.205***	0.157***	0.162***	0.156***	0.156***	0.156***
			[5.797]	[4.454]	[4.578]	[4.472]	[4.487]	[4.484]
Never Married				-0.424***	-0.475***	-0.416***	-0.418***	-0.417***
				[-7.917]	[-8.776]	[-7.725]	[-7.840]	[-7.807]
Unmarried				-0.592***	-0.597***	-0.554***	-0.557***	-0.556***
				[-27.883]	[-28.218]	[-26.304]	[-26.444]	[-26.456]
Parent					-0.090***	-0.059***	-0.059***	-0.059***
					[-4.480]	[-3.151]	[-3.174]	[-3.141]
Empl Part						-0.061**	-0.060**	-0.060**
						[-2.157]	[-2.121]	[-2.124]
Unemployed						-0.340***	-0.333***	-0.334***
						[-5.590]	[-5.374]	[-5.374]
Out Workforce						-0.009	-0.009	-0.009
						[-0.273]	[-0.289]	[-0.291]
ln(Eqv. Inc.)						0.124***	0.122***	0.123***
						[11.783]	[11.524]	[11.672]
ln(GDPpc)							-0.277	
							[-0.680]	
Lag ln(GDPpc)							0.472	
							[1.464]	
Unemp. Rate							-0.018**	-0.021***
							[-2.115]	[-3.421]
Gini							-2.380**	-2.524***
							[-2.539]	[-2.691]
ln(House Price)							-0.094	
							[-0.978]	
Inflation							0.003	
							[0.632]	
Location and Quarter Controls	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	28803	24161	24161	24161	24161	24161	24161	24161
R2 (psuedo)	0.008	0.010	0.017	0.039	0.039	0.045	0.045	0.045

Source: Author's calculations based on data reported in text.
Notes: Additional control variables include age, age squared, ten-year birth-cohort, and mother's and father's education. Location and quarter controls are dummies for census division, rural location, and quarter of interview. The estimated regression (specified in OLS) is: $happy_{it} = \alpha_0 + \boldsymbol{\beta}'\boldsymbol{x}_{it} + \boldsymbol{\gamma}'\boldsymbol{y}_t + \delta preces_t + \lambda_0 trend_t + \lambda_1 d_{08} + \lambda_2 d_{10} + \varepsilon_{it}$. $happy_{it}$ is reported happiness for individual i in year t; $\boldsymbol{x}_{it}$ is a vector of individual characteristics; $\boldsymbol{y}_t$ is a vector of macro economic variables, $preces_t$ is a dummy variable for past recessions; $trend_t = year_t - 1972$ and d_t are dummy variables for the years 2008 and 2010. For specification 1, the full sample is used (1973 – 2014). For specifications 2 – 8, the sample is restricted to the years 1977 – 2012, because nativity data are available beginning in 1977, and the Gini coefficient is not available for 2014.
t statistics in brackets (clustered by year); * $p<.10$ ** $p<.05$ *** $p<.01$.

The happiness association with being foreign-born or a young adult depends on other covariates. At the macro level, income inequality and the unemployment rate play the largest role. Remember income inequality could be interpreted as affecting trust and feelings of fairness (Oishi et al. 2011), and the unemployment rate can be interpreted as affecting feelings of job security when individual employment status is also controlled. In contrast to what one might expect, housing prices at the census division level do not help explain the declines. Social expenditures, GDP per capita, and inflation were also dropped because they are not statistically important. Social expenditures were not presented because they reduced comparability across columns (they are only available beginning in 1980).[24]

Table 3-4 presents the more important results. The happiness declines from long-term trends are accounted for by the added micro-control interactions, which as explained below, is shown by the Year 2010 dummy (Panel A) being reduced in magnitude and significance. Specifically, full-time employed people are not statistically less happy than trend in 2010, and people report the trend level of happiness when excluding the effects of income.[25]

The first column of Table 3-4 presents the results from the base model with location and quarter-of-interview controls added. The subsequent columns include the macro and micro controls from Table 3-3, column 8, and add interactions with key micro variables. In column 2, employment status is interacted with the Recession dummies. Because the omitted category is employed full-time, the Recession dummies capture the effect of being employed full-time during the years 2008 and 2010. Thus, the insignificant Year 2010 dummy (column 2) means

[24] Social expenditures may still effect the transmission of the Recession's effects, but self-reported income includes government transfers. For this reason we cannot identify the full effects of social expenditures while income is controlled.

[25] Like all regression results, this result is conditional on the other controls included in the regression. The robustness section below discusses the effects of employment and income from the base model without additional micro and macro controls.

Table 3-4 Deviations from Long-Term Happiness Trends; Ordered-Probit Regressions for U.S. Sample with added Controls and Interactions, 1977 – 2012.

Panel A	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Past Recession	-0.068**	-0.022	-0.022	-0.022	-0.021	-0.020	-0.021	-0.021
	[-2.100]	[-0.935]	[-0.957]	[-0.937]	[-0.930]	[-0.880]	[-0.929]	[-0.896]
Trend	-0.011***	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	[-3.432]	[-0.008]	[-0.015]	[-0.003]	[-0.004]	[-0.074]	[-0.006]	[-0.048]
Year 2008	-0.114***	-0.163***	-0.789***	-0.854***	-0.722***	-0.578***	-0.716***	-0.354**
	[-5.913]	[-5.872]	[-6.385]	[-6.713]	[-5.714]	[-4.335]	[-5.614]	[-2.559]
Year 2010	-0.150***	-0.043	-0.023	0.061	0.155	0.230	0.149	0.273*
	[-9.098]	[-1.228]	[-0.172]	[0.437]	[1.138]	[1.599]	[1.085]	[1.873]
Empl Part X 2008		0.073**		0.096***	0.096***	0.110***	0.095***	0.113***
		[2.304]		[3.033]	[3.072]	[3.509]	[3.037]	[3.600]
Unemployed X 2008		-0.065		-0.020	-0.021	0.011	-0.021	0.029
		[-1.031]		[-0.311]	[-0.321]	[0.184]	[-0.326]	[0.471]
Out Workforce X 2008		0.027		0.047	0.049	0.043	0.049	0.052
		[0.841]		[1.427]	[1.476]	[1.286]	[1.495]	[1.592]
ln(Eqv. Inc.) X 2008			0.063***	0.067***	0.057***	0.046***	0.057***	0.038***
			[5.617]	[5.938]	[5.130]	[3.968]	[5.135]	[3.227]
Empl Part X 2010		-0.027		-0.034	-0.033	-0.035	-0.033	-0.034
		[-0.840]		[-1.096]	[-1.072]	[-1.122]	[-1.083]	[-1.086]
Unemployed X 2010		0.233***		0.227***	0.236***	0.238***	0.237***	0.236***
		[3.622]		[3.466]	[3.578]	[3.662]	[3.600]	[3.619]
Out Workforce X 2010		-0.104***		-0.110***	-0.106***	-0.111***	-0.107***	-0.109***
		[-3.342]		[-3.530]	[-3.351]	[-3.517]	[-3.406]	[-3.494]
ln(Eqv. Inc.) X 2010			-0.004	-0.010	-0.017	-0.022*	-0.017	-0.023*
			[-0.370]	[-0.851]	[-1.437]	[-1.832]	[-1.491]	[-1.929]
High School X 2008					-0.057**	-0.053**	-0.057**	-0.045*
					[-2.421]	[-2.326]	[-2.379]	[-1.908]
High School X 2010					-0.053**	-0.055**	-0.053**	-0.052**
					[-2.170]	[-2.314]	[-2.149]	[-2.122]
Nev.Mar. X 2008						-0.160***		-0.270***
						[-3.654]		[-6.038]
Nev.Mar. X 2010						-0.092*		-0.114**
						[-1.914]		[-2.333]
UnMar. X 2008						0.013		0.005
						[0.514]		[0.183]
UnMar. X 2010						0.030		0.027
						[1.100]		[0.988]
Parent X 2008							-0.009	-0.163***
							[-0.343]	[-7.752]
Parent X 2010							0.018	-0.038*
							[0.632]	[-1.763]

Table 3-4 Continued

Panel B	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
High School and Less		-0.065**	-0.065**	-0.064**	-0.058*	-0.058*	-0.058*	-0.058*
		[-2.021]	[-2.014]	[-2.014]	[-1.727]	[-1.720]	[-1.719]	[-1.717]
Bach. Deg. +		0.074**	0.073**	0.074**	0.074**	0.074**	0.074**	0.075**
		[2.035]	[2.003]	[2.019]	[2.033]	[2.027]	[2.035]	[2.056]
Never Married		-0.416***	-0.417***	-0.416***	-0.416***	-0.402***	-0.416***	-0.396***
		[-7.804]	[-7.808]	[-7.806]	[-7.803]	[-7.212]	[-7.812]	[-7.053]
Unmarried		-0.556***	-0.556***	-0.555***	-0.555***	-0.558***	-0.555***	-0.558***
		[-26.424]	[-26.378]	[-26.347]	[-26.286]	[-23.976]	[-26.278]	[-23.893]
Parent		-0.058***	-0.058***	-0.058***	-0.058***	-0.057***	-0.059***	-0.047**
		[-3.111]	[-3.143]	[-3.112]	[-3.115]	[-3.089]	[-2.950]	[-2.444]
Empl Part		-0.063**	-0.061**	-0.064**	-0.064**	-0.065**	-0.064**	-0.065**
		[-2.041]	[-2.146]	[-2.087]	[-2.094]	[-2.120]	[-2.094]	[-2.132]
Unemployed		-0.357***	-0.334***	-0.358***	-0.359***	-0.360***	-0.359***	-0.360***
		[-5.339]	[-5.372]	[-5.362]	[-5.370]	[-5.409]	[-5.372]	[-5.408]
Out Workforce		-0.005	-0.010	-0.006	-0.007	-0.006	-0.007	-0.006
		[-0.141]	[-0.323]	[-0.190]	[-0.202]	[-0.169]	[-0.200]	[-0.182]
ln(Eqv. Inc.)		0.123***	0.120***	0.120***	0.121***	0.122***	0.121***	0.123***
		[11.705]	[10.504]	[10.477]	[10.506]	[10.525]	[10.491]	[10.530]
Macro Controls	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	24161	24161	24161	24161	24161	24161	24161	24161
R2 (psuedo)	0.010	0.045	0.045	0.045	0.045	0.046	0.045	0.046

Source: Author's calculations based on data reported in text.
Notes: Additional control variables include age, age squared, ten-year birth-cohort, mother's and father's education, census division, rural location, quarter of interview, woman, black, youth, foreign born, republican, and religious. Macro controls include the unemployment rate, and Gini coefficient. The estimated regression (specified in OLS) is: $happy_{it} = \alpha_0 + \boldsymbol{\beta}'\boldsymbol{x}_{it} + \boldsymbol{\gamma}'\boldsymbol{y}_t + \delta preces_t + \lambda_0 trend_t + \lambda_1 d_{08} + \lambda_2 d_{10} + \boldsymbol{\lambda_3}'\boldsymbol{c}_{it} d_{08} + \boldsymbol{\lambda_4}'\boldsymbol{c}_{it} d_{10} + \varepsilon_{it}$. $happy_{it}$ is reported happiness for individual i in year t; $\boldsymbol{x}_{it}$ is a vector of individual characteristics; $\boldsymbol{y}_t$ is a vector of macro economic variables, $preces_t$ is a dummy variable for past recessions; $trend_t = year_t - 1972$ and d_t are dummy variables for the years 2008 and 2010. $\boldsymbol{c}_{it}$ is a vector of individual variables or channels that may explain the Great Recession. They are also included in $\boldsymbol{x}_{it}$. The sample is restricted to the years 1977 – 2012, because nativity data are available beginning in 1977, and the Gini coefficient is not available for 2014.
t statistics in brackets (clustered by year); * p<.10 ** p<.05 *** p<.01.

full-time employed people did not report a decline from long-term trends in 2010. In column 3, income is interacted with the Recession dummies, and the 2010 dummy indicates that after accounting for income changes, people are not statistically less happy than trend levels. Remember the income measure is adjusted family income, from all sources, and not conditional on employment.

Column 4 indicates that people with high school or less education are less happy than those with more education (Panel B), and education is more important during the Recession (see

the negative coefficient on the high-school Recession interactions in Panel A). Lower educated people may be more vulnerable to the effects of the Recession or have inferior support systems. Moving across the columns, married people are happier on average (Panel B), and never married people are even worse off during the Recession (column 6, Panel A). Marriage could mitigate the negative effects of the Recession, but unmarried people (separated, divorced, and widowed) people were not differentially affected during the Recession. Column 7 shows parents (married and unmarried) were also not differentially affected during the Great Recession (insignificant parent-Recession interactions), but when controlling for marriage during the Recession (column 8), parents do report a larger negative relationship with SWB. As a reminder, the coefficient on 2010 is for the omitted category with continuous controls accounted for separately, which means the positive and significant coefficient on 2010, in column 8, shows that married people, who are full-time employed, have no kids, have more than a high school education, and excluding income effects, showed an increase in happiness during 2010 (at 10 percent significance).

It is interesting to note that the declines in happiness observed in 2008 are not well explained. As discussed earlier, the survey in 2008 preceded much of the economic decline, and it is likely for this reason that the decline in 2008 cannot be explained by economic factors. Note too, however, that education, marital status, and parental status also fail to explain the impacts in 2008. It is possible that Americans perceived uncertainty in anticipation of the economic declines and that reduced their happiness.

Robustness Checks—Additional results emphasize the importance of income during the Great Recession. In the previous analysis, the deviations were measured from a linear trend, and the decline during 2010 was statistically explained with micro, macro, and micro interactions.

However, the models may face problems with endogeneity associated with behaviorally chosen variables, and it is possible that the long-term trends are non-linear. For these reasons, two robustness checks were used.

The first check uses regressions that separately add the income and employment status interactions to the base model. This reduces endogeneity concerns because the variables resulting from behavioral choice are excluded, and the main effects of income and employment should capture any endogenous relationship that is not specific to 2008 or 2010. As an added benefit, the full period (1973 – 2014) is retained when excluding nativity and the Gini coefficient from the regressions. The second check uses a cubic trend in place of the linear trend.

The 2010 marginal effects, or probability of reporting "very happy" are reported in Appendix Table B-5. Remember the marginal effects are associated with the 2010 dummy or main effect excluding the interaction terms. Without additional controls, the interactions between income and the Recession dummies are sufficient to account for the decline in happiness reported in 2010 (shown in column 3), and this result does not depend on a linear trend (column 5). In contrast, full-time employed people are statistically less happy in 2010 (column 2). Without controls, they report a smaller decline in 2010 than the average person, but the decline is still statistically significant. Reduced income is the most important channel affecting happiness during the Great Recession, and this result holds under multiple scenarios. However, it is important to remember that income and unemployment are not independent of each other. Changes in adjusted family income may result from changes in: personal wages, family member wages, household composition, government transfers, or have been caused by unemployment or underemployment.

As mentioned, adjusted family income was relied upon because personal income data was more likely to be missing (40 percent compared to 10 percent). However, it may be expected that the happiness-income relation depends on the source of income. To determine if the income measure drives the key results, an additional robustness test was used. In column 6 of Appendix Table B-5, real personal income and its interaction with the Recession dummies was added to the base model. Results for the comparable analysis using adjusted family income are presented in column 3. Comparing the two estimates, the results are visibly different, but neither is statistically significant. Like adjusted family income, reduced personal income in 2010 can account for the average reported decline in happiness in 2010.

Happiness Changes by Individual.—The interpretation of the long-term analysis is limited to comparisons of different people. To measure the effects of variable changes over time for a given person, longitudinal or panel data are necessary. Using the relatively new GSS Panel data (covering the period 2006-2014) [26] I further tested the mechanisms affecting happiness during the Great Recession using a fixed-effects logit specification. The main conclusion is the same. Declining income statistically explains the happiness declines in 2010. However, this result may be considered more robust, because individual fixed effects capture omitted time-invariant factors.

The panel analysis is similar to the long-term but differs in a few important aspects. Year dummies are added for each year in the sample excluding 2010, making it the reference period, not long-term trends. Then similar to the robustness checks, income and employment status are

[26] In 2006 the General Social Survey added a longitudinal component that tracks the same people over time, and there are now three separate overlapping panels, each with three waves, that collectively cover the years 2006-2014. The first panel was fielded in 2006, 2008 and 2010, the second panel 2008, 2010, and 2012, while the last panel (to-date) was fielded in 2010, 2012, and 2014.

separately added to see if they can explain the year effects. 2010 was used as the reference period because it had the lowest level of happiness and was the only year that each GSS panel was fielded (see footnote 26). Fixed-effects logit specifications are used with the binary variable "very happy" because ordered probit models are not possible with fixed effects (Cameron and Trivedi 2005, 796).[27]

Appendix Table B-6 presents the results. Column 1 includes only the year dummies (fixed effects are also included with the model). Compared with 2010, each year is positively associated with the probability of reporting "very happy". Note the estimates do not have a linear interpretation, but consistent with previous findings they are increasing away from 2010 (i.e. people are happiest in 2006 and 2014). Column 2 adds controls for income and employment status. Each year is still statistically significant and positive. Accounting for the period-average income and employment relationships are insufficient to account for the 2010 decline in happiness.

Column 3 excludes the income control, but interacts employment status with each year. The results show that a full-time employed person (the omitted category) or someone with no change in employment status[28] reports comparable happiness in 2008 and 2010 (2008 is not statistically different from 2010). However, they are happier in the other years when compared to 2010.

Column 4 presents the main effects for each year when income-year interactions are used. Excluding the effects of income, individuals are not statistically more likely to report "very happy" during 2006, 2008, or 2012. They are equally happy in 2010, which is consistent with the

[27] There are ordered logit estimation techniques that allow fixed effects (e.g. Ferrer-i-Carbonell and Frijters, 2004) but the binary-response logit model is consistent and simpler to implement.

[28] The effect of not changing employment status is treated the same as being in the reference group because fixed-effects models estimate the effects of changes in independent variables. Also, anyone that did not report a change in "very happy" over the period is dropped from the regression.

long-term analysis. However, the 2014 main effect is statistically significant, which indicates people are happier in 2014 than in 2010, even when excluding the effects of differences in income.

3.5.3 Channels by Population Group

The explanations of the Great Recession's effects for various population groups are similar to those for the population as a whole. Declining income statistically accounts for the declines in happiness reported by each group in 2010, with one exception. Rising unemployment is also important.

A summary of the results can be illustrated with the reported declines before and after accounting for the plausible channels. In Figure 3-2 the darker bars correspond to the 2010 declines in the probability of reporting "very happy". The first estimates are from the base model and repeated from Table 3-1. Note that as before, the deviations are negative and statistically significant at five percent for each population group except youth (18-24). The lighter grey bars are for the base model, but with additional channels controlled. Specifically, the light-grey deviations show the "effects" of 2010 excluding income's association with happiness. Notice the confidence intervals greatly increase, and for men and blacks, what were statistically significant and negative deviations are now positive and significant. The 2010-reported decline in happiness is accounted for with micro and macro controls, and income-interactions. Women are, however, an exception when using income interactions. The supporting estimates are presented in Table 3-5 and discussed below, along with alternative models.

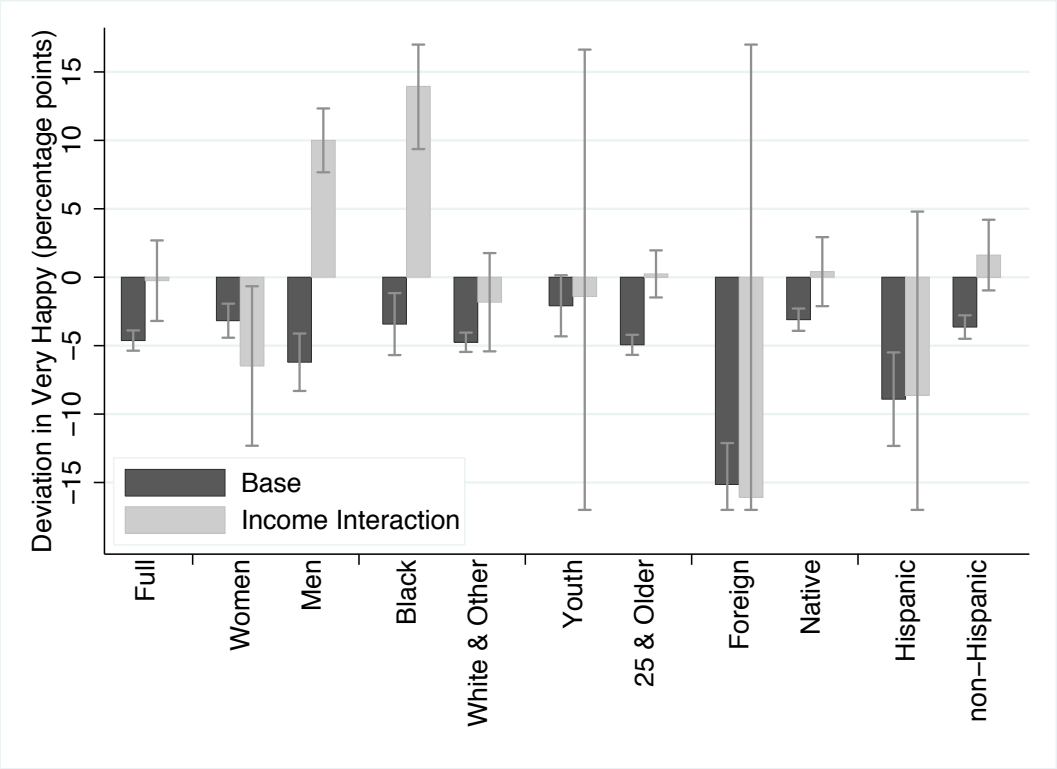

Figure 3-2 2010 Deviation from Long-Term Trend – Change in Probability of Reporting "Very Happy", Two Models by Population Group

Source: Author calculations based on data and analysis reported in text.
Notes: The value of nearly -5 for "Full" (Base) indicates that the full sample was approximately 5 percentage points less likely to report being "very happy" in the year 2010, when compared to long-term trends. "Base" corresponds to the estimates reported in Table 3-1, based on the regressions in Table 3-2. "Inc. Int." shows the deviations excluding the effects of declining income. The figures correspond to the estimates reported in Table 3-5, Income Int. row, which for the full sample, are in turn based on Table 3-4, column 3. Error bars represent 95 percent confidence intervals. They have been truncated when extending beyond -17 or 17 to reduce the size of the figure.

Table 3-5 provides a summary of the 2010 change in the likelihood a population group will report being "very happy". The estimates are marginal effects from ordered probit regressions for the 2010 dummy or main effect. The first row repeats the declines reported in Table 3-1. Subsequent rows show how the declines change as controls are added to the base model. For the full sample, the rows correspond to the columns in Tables 3-3 and 3-4 (specific columns are listed in the footnotes). Compared to the base model, the model for the row labeled "Micro Controls" adds dummies (without interactions) for: census division, rural location, quarter of interview, education level, republican, religious, marital status, parent, employment status, and

income. The macro controls include the unemployment rate, and Gini coefficient. The statistically insignificant marginal effect for Hispanics in row 2 means the micro controls are sufficient to account for their 2010 decline in reported happiness.[29]

The rows beginning with "Empl. Status Int." add Recession year interactions with: 1) employment status (employed full-time is omitted); 2) income; 3) employment status and income; and 4) high school education (less than high school omitted), employment status, and income. The row "Income Int." presents the estimates associated with figure 2. With the interactions, the reported marginal effects represent the deviations for the omitted category or excluding the effects of income. The last row, for example, is based on the model with micro and macro controls, and interactions with employment status, income, and high school or less education (Table 3-4, column 5), and the marginal effect is for people employed full-time, with more than a high school education, and excluding the association with income.

Moving down the rows in Table 3-5, column 1, the reduced magnitude and significance of the 2010 "effects" shows that the unexplained decline in happiness reported in 2010 can be accounted for with micro and macro controls (shown by the reduced magnitude), but requires income or unemployment interactions to completely account for the decline (reduced average decline reported by several groups, specifically: whites and other races, youth, and those older than 24. For other groups, reduced feelings of job security and increasing income inequality (macro controls) are sufficient (women, blacks, native-born, and non-Hispanics). In stark contrast, women do not report a decline in 2010 with unemployment interactions, but they do

[29] Remember the analysis for Hispanic and non-Hispanic groups only covers the period 2000 – 2012 based on availability of the Hispanic variable and Gini coefficient. It is likely due to the shorter period that Hispanics only require controls for the period-average relationship between income and unemployment to statistically account for the declines in 2010.

when controlling for income interactions – even full-time employed women. This result is unexpected and should be explored further in future analysis.

Table 3-5 2010 Deviation from Long-Term Trend – Change in Probability of Reporting "Very Happy" by Population Group with Specified Controls

Panel A	(1)	(2)	(3)	(4)	(5)	(6)
	Full Sample		Women	Men	Black	White and Other
Base	-0.046***		-0.032***	-0.062***	-0.034***	-0.048***
	[-12.245]		[-5.000]	[-5.799]	[-2.965]	[-13.208]
Micro Controls	-0.040***		-0.020***	-0.063***	-0.030**	-0.042***
	[-7.318]		[-3.123]	[-6.931]	[-2.512]	[-6.357]
Macro Controls	-0.023**		-0.003	-0.046***	-0.016	-0.024**
	[-2.315]		[-0.280]	[-4.144]	[-1.235]	[-2.205]
Empl. Status Int.	-0.015		0.008	-0.038***	0.016	-0.018
	[-1.224]		[0.556]	[-2.749]	[1.054]	[-1.368]
Income Int.	-0.003		-0.065**	0.100***	0.139***	-0.018
	[-0.167]		[-2.181]	[8.402]	[5.968]	[-0.997]
Empl. & Inc. Int.	0.007		-0.059**	0.146***	0.314***	-0.015
	[0.466]		[-2.061]	[8.880]	[6.129]	[-0.834]
High School, Empl. & Inc. Int.	0.019		-0.061*	0.150***	0.324***	-0.009
	[1.363]		[-1.865]	[8.775]	[4.128]	[-0.497]

Panel B	(1)	(2)	(3)	(4)	(5)	(6)
	Youth	25 and Older	Foreign-Born	Native-Born	Hispanic	nonHispanic
Base	-0.021*	-0.049***	-0.151***	-0.031***	-0.089***	-0.036***
	[-1.834]	[-13.177]	[-9.810]	[-7.476]	[-5.113]	[-8.329]
Micro Controls	-0.044***	-0.041***	-0.127***	-0.029***	-0.012	-0.035***
	[-2.774]	[-5.706]	[-4.935]	[-4.594]	[-1.448]	[-5.579]
Macro Controls	-0.032*	-0.022**	-0.109***	-0.010	-0.028	-0.051
	[-1.652]	[-2.133]	[-4.803]	[-0.861]	[-0.452]	[-0.832]
Empl. Status Int.	-0.029	-0.014	-0.057**	-0.009	0.004	-0.062
	[-1.123]	[-1.160]	[-2.321]	[-0.652]	[0.056]	[-0.916]
Income Int.	-0.014	0.002	-0.161	0.004	-0.021	0.014
	[-0.153]	[0.275]	[-0.893]	[0.317]	[-0.428]	[0.940]
Empl. & Inc. Int.	0.022	0.006	-0.017	0.005	-0.022	0.005
	[0.279]	[0.736]	[-0.122]	[0.323]	[-0.392]	[0.159]
High School, Empl. & Inc. Int.	na	0.019***	0.143*	0.007	na	0.010
		[2.861]	[1.712]	[0.519]		[0.334]

Source: Author's calculations based on data reported in text.
Notes: The first row of each panel corresponds with Table 1. The subsequent rows correspond as follows: second row - Table 3-3, column 6; third - Table 3-3, column 8; fourth - Table 3-4, column 2; fifth – Table 3-4, column 3; sixth – Table 3-4, column 4; seventh – Table 3-4, column 5. Results were omitted if the bin size was too small (e.g. there was less than 30 youth in the sample who were full-time employed and also had a high school or less education in 2010). For the same reason specifications including interactions for parents and marital status were excluded.
t statistics in brackets (clustered by year); * $p<.10$ ** $p<.05$ *** $p<.01$.

Among some of the other interesting results, remember the foreign-born showed the largest decline in the likelihood of reporting "very happy" during 2010 (15.1 percentage points). Table 3-5, panel B, column 3, shows that even the full-time-employed foreign-born reported a 10.9 percentage point decline, which is substantial because the next largest decline, excluding for Hispanics,[30] was for men at only 6.2 percentage points (Table 3-1, panel A). The 10.9-point decline for the full-time-employed foreign-born is 75 percent greater than the average for men (employed and unemployed). However, adding the income interaction is sufficient to account for the foreign-born's reported decline in happiness (Table 3-5, panel B, column 3, the decline is large but no longer statistically significant). Income interactions are important for other groups too, especially men and blacks who become statistically happier in 2010 when excluding the effects of income.

The figures by population group are based on the same analysis that was applied to the full sample, but with added group interactions. Full regression results that form the basis for Table 3-5 (analogous to Tables 3-3 and 3-4) are available upon request.

3.6 Comparison With the 1980s Recession

The early 1980s was another period of significant economic decline. Periods of 1980, 1981, and 1982 were officially recognized as recessions (NBER 2014), and in some ways this period may have been worse than the Great Recession. The annual unemployment rates, at more than 9.5 percent, were the same or higher in 1982 and 1983 compared to 2009 and 2010. However, the annual unemployment rate did decline below 8.0 percent in 1984, but remained above 8.0 percent during the Great Recession until 2013 (BLS 2015a). Which period had a greater impact

[30] Hispanics were not referenced due to the large overlap between Hispanics and the foreign-born. In the weighted GSS sample, more than one third of Hispanics are foreign-born and similarly, more than one third of the foreign-born are Hispanic, though the exact figures depend on the survey year.

on the American people? And did the 1980s recession affect SWB through the same channels, especially unemployment and income?

The 1980s results, which are available upon request, show 1983 was in fact associated with a larger decline in happiness than 2010. The population was 6.0 percentage points less likely to report being "very happy" in 1983, and only 4.6 percentage points less likely in 2010. This result is partially explained by women's happiness. Women reported substantially larger declines in 1983 (5.5 percentage points) than in 2010 (3.2 percentage points). This result is unexpected given women faced larger decreases in employment and income during the Great Recession.[31] The foreign-born again reported greater declines in happiness than the rest of the population, but the difference was not as extreme (1983: 7.2 percentage point decline, 2010: 15.1 percentage points).[32]

The 1980s recession warrants further analysis. Unlike 2010, the decline in 1983 cannot be explained with declining income and rising unemployment. Even married people, who are full-time employed, have no kids, have more than a high school education, and excluding the effects of income, are statistically less happy in 1983 than trend levels. The two recessions also differ in duration. Figure 3-1 illustrates how long happiness was below trend during the Great Recession, and how short the deviation was during the 1980s. Statistically the Great Recession's impacts started in 2008, at a 2.0 percent point decline in happiness from trend, while the 1980s happiness decline began in 1982 at only 1.0 percentage point (the decline in 1980 was not

[31] Compared to 1980, women's 1983 self reported income was approximately the same, and their unemployment share increased by approximately 0.9 percentage points.

[32] The analysis for the 1980s mirrors that for the Great Recession. The models employed were the same, except the Great Recession dummies were for the years 2008 and 2010, and the 1980s dummies were for the years 1980, 1982, and 1983. The past recession dummy was also changed. The 1980s recession years were swapped for the Great Recession years.

statistically significant and the GSS was not fielded in 1981). To compare the recessions' impacts, future analysis should also account for their duration.

3.7 Conclusion

Surveys from mid-2010, one year after the official end of the Great Recession, mark the lowest level of happiness in the United States since consistent measurement began in the early 1970s. Declining income and employment from the Recession best explain the drop in happiness during 2010. Of the population groups studied, the foreign-born reported declines in both income and employment that were among the largest, and correspondingly, the largest decline in happiness, which was more than three times greater than the full population. Compared to women, men reported greater declines in happiness, income, and employment. Contrary to expectations, young adults (18-24) reported a smaller decline in happiness than older people, which is likely because they reported one of the smallest increases in unemployment. The most important macro relationships during this period were associated with the rising unemployment rate and income inequality. The other macro variables, GDP, inflation, house prices, and social expenditures did not statistically affect happiness when individual characteristics were also controlled. To help summarize the results, Figure 3-2 illustrates the initial declines by population group and estimates of the declines excluding the effects of changing income. As a reminder, supporting income and employment data from the GSS are presented in Appendix Table B-3.

The mechanisms are not surprising. As discussed in the literature section, past work on economic crises has pointed to income loss and unemployment as the drivers of declining well-being. In general, income losses have larger negative effects on well-being than the positive effects of gaining an equivalent amount (Kahneman and Tversky, 1979), and during the

Recession this effect was likely amplified. Individuals faced reduced consumption and increased stress associated with meeting financial obligations, especially mortgages. Income loss also affects factors not strictly related. Take spousal job loss as an example; it will reduce family income and possibly affect marital satisfaction. Underemployment is another - it is likely to reduce income and job quality, thus affecting job satisfaction. The effects of unemployment on well-being are also far reaching. Beyond its effects on income, there are substantial non-pecuniary costs. Winkelmann and Winkelmann (1998) show that the non-pecuniary effects of unemployment on life satisfaction are larger than from the loss of income alone. The Introduction to the journal this analysis is published in also discusses the effects of job loss during the Great Recession, including the non-pecuniary effects (Kalleberg and von Wachter 2017).

The results are based on estimates of group-specific deviations from group-specific trends covering a period of approximately 40 years, with various micro and macro controls to explain the deviations, and supplemented by panel-data analysis with individual fixed effects. The analysis differs substantively from the two closest studies, (Graham, Chattopadhyay, and Picon 2010) and (Deaton 2011). Without their data limitations, the present analysis is better placed to document the effects of the Recession on the SWB of different populations in a long-term context.

Chapter 4 Happier People Are Less Likely To Be Unemployed: Evidence From Longitudinal Data In Germany

4.1 Introduction

Traditional empirical models of labor market performance omit important determinants. In theory wages depend on a worker's marginal productivity, which has been modeled most frequently using human capital variables like education and experience. However, more recent theoretical and empirical work has begun incorporating psychological measure, especially "character skills" (Borghans et al. 2008). Character skills affect labor market outcomes independently of traditional human capital measures; in some cases they are more important than cognitive ability (Heckman and Kautz 2013). Character skills are typically measured using the Big-Five personality traits, but, the Big-Five are usually unavailable in national surveys. This paper demonstrates that subjective well-being (SWB) can be used to predict unemployment, and that SWB measures, like happiness, are closely related to character skills. SWB represents an alternative psychological measure that predicts performance, and one that is more widely available than personality traits.

While the burgeoning economics of happiness literature has focused mostly on the determinants of SWB, there is a small subset that evaluates the outcomes of SWB. The findings from this subset show SWB positively determines many factors that affect labor market outcomes including: productivity, health, education, and social capital (De Neve et al. 2013). However, the mechanisms through which SWB positively affect outcomes are not often identified. In the present context, it is helpful to think of SWB as an index that summarizes multiple dimensions of an individual, including both life circumstances and psychological attributes. Improvements in an individual's productive traits are likely to improve performance

as well as SWB. By controlling for life circumstances, this paper focuses on the effects of SWB on unemployment that are due to changes in otherwise unobservable psychological characteristics.

The results in the present paper show: people reporting higher SWB are less likely to be unemployed, and personality operates as one of the mechanisms. Changes in the Big-Five personality traits are related to changes in SWB. For example, within-person increases in extraversion or emotional stability are associated with increases in SWB. The SWB-unemployed relation has a meaningful magnitude as well. A one standard deviation increase in lagged SWB is associated with approximately a one-percentage point decline in the probability of being unemployed in Germany (1996-2013). The results also show two important variants to the relation. The magnitude is substantially larger for people who are currently unemployed than employed people (a novel result). Second, at high levels of SWB, greater SWB is associated with a greater likelihood of being unemployed. SWB can be a bad thing, because the SWB-unemployed relation is quadratic (consistent with Krause, 2013).

The SWB-unemployed relation is estimated using separate dynamic and fixed-effects regressions with a rich set of controls that account for many potential sources of bias. In the dynamic specification, unemployment is regressed on lagged unemployment and lagged SWB; reverse causality could only operate through an individual's expectations of being unemployed, which is captured using controls for individuals' job-market expectations and job satisfaction. The individual fixed effects capture fixed unobserved factors. The other controls include: typical socio-economic variables, self-reported health, unemployment history, industry and occupation categories, and macro and seasonal effects. SWB data come from the German Socio-Economic Panel (GSOEP).

Additional robustness is established using a placebo test and the Arellano and Bond (1991) (AB) generalized methods of moments (GMM) approach. The placebo test shows that family satisfaction is not significantly related with being unemployed and thus rules out measurement error or omitted variables related to satisfaction questions as a mechanism. The AB method also supports the main results, showing increasing SWB reduces the likelihood of being unemployed, albeit with a larger magnitude than in the main analysis. The AB method has the benefits of simultaneously controlling for dynamics and fixed effects, and allowing for endogeneity in the regressors, but depends on strong assumptions.

This paper adds to the settings and methods used in similar papers. There are no studies with directly comparable results. The samples used in similar papers are typically constrained to initially unemployed people. I am not aware of any similar studies that appropriately use fixed-effects or the same robustness checks. The most similar study is Krause (2013). Krause (2013) uses a sample of initially unemployed people in Germany, and a similarly rich set of controls but without fixed effects. The present paper also provides empirical evidence to support personality traits as one of the mechanisms through which SWB affects outcomes – there is only a limited amount of similar evidence in the literature (e.g. Krause 2013).

In Chapter 4, Section 4.2 reviews evidence from the literature related to the effects of SWB on income and employment. Section 4.3 presents the data and primary methods. Section 4.4 presents the main results and robustness tests. Section 4.5 points to character skills as the mechanism that explains the effects of SWB on unemployment and draws implications for future research using SWB as a determinant. Section 4.6 concludes Chapter 4.

4.2 Past Evidence for Subjective Well-Being's Relation with Unemployment

Findings from the economics of happiness literature show SWB is a determinant of positive labor market outcomes. Important mechanisms include productivity, health, and character skills. Productivity is shown in an experimental setting, the details of which are discussed below (Oswald, Proto, and Sgroi 2015). The positive relation with health is partially attributed to "improve[d] immune, cardiovascular, and endocrine functioning (De Neve et al. 2013, 55)." (Tay, Kuykendall, and Diener 2015)[33] The evidence relating to character skills or personality traits is discussed in Section 4.5.

Positive effects of SWB are shown both in the psychology and economics literatures. A review of the evidence from psychology led Boehm and Lyubomirsky to conclude, "happiness often precedes measures of success and […] positive affect leads to improved workplace outcomes. (Boehm and Lyubomirsky 2008, 101)" The focus here, however, is on the methods and results from economics studies. For an introduction to the reverse relationship that focuses on unemployment as a *determinant* of SWB, see reviews in Layard, Clark, and Senik (2012) and Krause (2014).

Among the most notable of the related economics studies are Oswald, Proto, and Sgroi (2015) and De Neve and Oswald (2012). Oswald, Proto, and Sgroi (2015) is unique for showing that increasing SWB will causally increase productivity, which they accomplished by inducing positive affect in three lab experiments. [34][35] To extend the lab results, the authors also implemented a fourth trial, which showed that, participants who reported having experienced a

[33] However, not all studies find significant effects on health (c.f. Liu et al. 2016).

[34] In two experiments Oswald et al. induce positive affect by showing a randomly selected group of participants a comedy clip. In a third experiment, the treatment group is provided chocolate, fruit, and drinks. Productivity, measured on a standardized task, is increased in each case. In experiment three they spent approximately $2 per person to raise productivity by 20 percent for a short period of concentrated work.

[35] Similar lab experiments are rare; however, Ifcher and Zarghamee (2011) also randomly induce positive affect and show that it reduces time preferences over money.

family tragedy (akin to a natural experiment) also reported lower happiness and had lower productivities. Collectively, results from the three lab experiments and the fourth trial suggest that increases in emotional- and evaluative-SWB are likely to improve productivity.[36] This conclusion is further supported by De Neve and Oswald (2012), which shows that emotional- and evaluative-SWB are positively correlated to log income seven or more years later, using data from a representative U.S. panel (National Longitudinal Study of Adolescent to Adult Health). Their results are net of the effects from traditional human capital variables, including IQ, and also sibling fixed effects.[37]

There are a couple other notable studies that show positive effects of SWB. On income for example, in the U.S. (Mohanty 2009b; Mohanty and Ullah 2012), Russia (Graham, Eggers, and Sukhtankar 2004), and in more locations generally (De Neve et al. 2013, 56-57). Binder and Coad (2010) establishes a positive relationship between lagged well-being and each of the variables: marriage, health, income, and employment status in Britain. They use a vector auto regresison model that accounts for fixed effects, but it is not clear if they address Ncikell Bias (Nickell 1981). Two studies that use a prospective analytical approach include, Marks and Fleming (1999) and Roberts, Caspi, and Moffitt (2003). Each show positive effects of lagged SWB on work experiences years later (in Australia and New Zealand).

The most similar study is that of Krause (2013). There are only a few studies that I am aware of that use SWB to predict employment. She finds that SWB has an inverted U-shape relation with *reemployment* and reentry wage, using a sample of initially unemployed people in Germany during 2007 – 2009 (using the IZA Evaluation Dataset S). It is interesting to note that

[36] Remember positive affect differs from evaluative SWB, yet family tragedy is likely to have longer lasting effects on evaluative SWB than positive affect (Helliwell and Wang 2012).

[37] When entered together life satisfaction has a larger standardized effect on log income than positive affect, though admittedly the life satisfaction value was observed closer to the income observation.

the results do not hold for women. In her study *males* exiting into *self-employment* drive the main effect on *reemployment*. While fixed effects are not possible because there are only two time periods, she is able to control for labor market histories and future job prospects. The applicability of the findings from Krause (2013) for the current setting is however limited for two reasons. Krause (2013) focuses on a sample of unemployed people, which depends on the institutional environment and macroeconomic conditions. She also obtains the effects of SWB on reemployment, not the effects I investigate, on unemployment generally.

The studies that discuss search behavior similarly have limited comparability because they discuss reemployment, but they are still informative. The findings from these studies show unhappier people search for jobs more, which indicates a *negative* channel through which SWB affects employment. However, the negative effects may not be enough to offset the otherwise positive effects of SWB. The estimated net effects from the related literature are mixed (Clark 2003; Mavridis 2012; Krause 2013; Gielen and van Ours 2014). Each study uses fairly convincing identification strategies, but do not account for omitted fixed determinants of employment.

The present analysis contributes by estimating the effects of SWB on the likelihood of being unemployed in a unique setting – the German labor force, including employed and unemployed people, from 1996 – 2013. Indeed I show that there is a differential effect of SWB on unemployment when currently unemployed, which is something previous studies were unable to analyze. My study also controls for additional sources of bias through the use of fixed-effects, by using a placebo test to rule out measurement error as a driver of the results, and by supporting the results with Arellano and Bond (1991) type regressions.

4.3 Data and Empirical Methods

4.3.1 Data

The SWB and employment data are obtained from the German Socio-Economic Panel (GSOEP), a nationally representative survey that is made available by the German Institute for Economic Research (DIW), Berlin.[38] The GSOEP represents one of richest sources of longitudinal SWB data. It began in 1984 with approximately 18,000 individuals, and with replenishment samples, allows for repeated observations of more than 35,000 individuals totaling an approximate 280,000 SWB observations for the present study. The particular SWB measure for this chapter is referred to as life satisfaction, based on the question, "How satisfied are you with your life, all things considered?", which is evaluated on a scale from zero to ten.

The analyses are based on reduced samples that exclude people: who are out of the labor force throughout the entire sample period (e.g. retirees at initial observation), or if they are missing important variables, such as employment status, income, educational attainment, or SWB. People without at least three observations are also necessarily excluded in order to use lagged observations and fixed effects. People who left the sample (attrits) are discussed further in Appendix C.1. The period was also restricted to post-1995 due to the availability of a consistent question on labor market expectations.

4.3.2 Fixed Effects and Dynamic Ordinary Least Squares

Unemployment is assumed to depend on lagged unemployment, lagged SWB, and additional controls. This data generating process (DGP) is listed below as equation (1). U_{it} is a dummy

[38] German law restricts the sample to 95 percent of the original households (for users in non European Economic Area countries).

variable that takes the value of one if person i is unemployed at time t. SWB_{it-1} is standardized[39] life satisfaction for person i at period t-1. $\boldsymbol{X_{1,it}}$ is a vector of exogenous controls such as age, month, and year effects. Characteristics affected by the individual's choices, including income and educational attainment, have been included in $\boldsymbol{X_{2,it-1}}$. They are lagged to reduce concerns of reverse causality.

$$U_{it} = \rho U_{it-1} + \delta SWB_{it-1} + \boldsymbol{\beta}_0' \boldsymbol{X_{1,it}} + \boldsymbol{\beta}_1' \boldsymbol{X_{2,it-1}} + \alpha_i + \varepsilon_{it} \qquad (4\text{-}1)$$

Fixed effects, α_i, account for all fixed-characteristics observed and unobserved, including genetics and childhood experience. Including lagged unemployment accounts for unemployment dynamics, especially persistence, and also allows for additional controls that are conditional on being employed (e.g. industry and occupation).

Equation 4-1 cannot be estimated by ordinary least squares (OLS) without a serious source of bias. Nickell Bias (Nickell 1981) arises when including both lagged unemployment and fixed effects.[40] However equation 4-1 can be estimated when excluding the fixed effects or lagged unemployment. For this reason, I use fixed-effects (FE) estimation excluding lagged unemployment, and dynamic OLS (DOLS), which includes lagged unemployment but excludes the fixed effects. Fixed effects are often preferred, but in the case of employment outcomes, dynamics may be more relevant (Ashenfelter 1978). Estimates from the two methods should also bound the true estimate (Angrist and Pischke 2009, 184).[41] Under certain conditions it is possible

[39] To standardize, the sample mean is subtracted and this total is divided by the standard deviation. Standardization has also been used in past SWB research (e.g. Stevenson and Wolfers 2009).

[40] Fixed-effects models are typically estimated by subtracting from each variable its mean value over time, and in the case of a dynamic panel, the mean of the lagged dependent variable is correlated with the mean error term. In other words, de-meaning introduces a source of endogeneity.

[41] If fixed effects represent the true DGP, but a dynamic model is used, then the resulting estimate will be biased downward. However, if the true DGP is dynamic but fixed effects are used, then the estimate will be biased upward.

to use an alternative approach to account for both fixed effects and dynamics (e.g Arellano and Bond 1991). I discuss this approach in Section 4.4.4.

The controls include: current labor market indicators (employment status, unemployment history, income, and industry and occupation categories), traditional human capital variables (education, and potential experience and its square) (cf. Mincer 1974), socio-characteristics (religious, parental, and marital status), age categories, self-reported health, month of interview, and year by region (German state).

4.4 Results: SWB Predicts the Likelihood Of Unemployment

4.4.1 Main Results

Lagged SWB is negatively associated with being unemployed in Germany. The magnitude is meaningful as well. Table 4.1 presents the results. Recall that unemployed status is binary and life satisfaction has been standardized. Consequently the coefficients on lagged SWB reflect differences in the probability of being unemployed with approximately one standard deviation difference in lagged SWB. Columns 2 and 4 show that a one standard deviation increase in lagged SWB is associated with a decline in the probability of being unemployed between 0.10 and 0.13 percentage points. As mentioned in the methods section, the DOLS and FE estimates should set bounds on the true estimate, and indeed, the FE estimate is larger (smaller negative number) as expected. The DOLS estimations include lagged employment status, omitting employed fulltime as the comparison group, but exclude fixed effects. In contrast, the fixed-effects (FE) regressions exclude employment status. Column 1 presents the OLS results for comparison.

A great many potential sources of bias have been accounted for using the DOLS and FE approaches. Anything that affects current unemployment that also affects lagged employment status is captured, which includes many traditional human capital characteristics, both observed and unobserved. Likewise, unobserved ability, family characteristics, and all other fixed characteristics are captured using fixed effects. That includes sources of measurement error to the extent they are fixed, such as reporting bias. Time-varying factors that occur at the German state level are also accounted for with state-by-year dummies.

Table 4-1 Unemployed and Life Satisfaction Regressions. Dependent Variable: Unemployed

	(1) OLS	(2) DOLS	(3) DOLS	(4) FE	(5) FE
Life Sat. (ST)	-0.033***	-0.013***	-0.007***	-0.010***	-0.008***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Unemployed		0.457***	0.437***		
		(0.005)	(0.005)		
Retired		0.024***	0.016***		
		(0.002)	(0.002)		
In School		0.031***	0.022***		
		(0.004)	(0.004)		
NonWorking		0.018***	0.007***		
		(0.002)	(0.002)		
Temp. NonWork		0.048***	0.041***		
		(0.003)	(0.003)		
Other Status		0.050***	0.044***		
		(0.003)	(0.003)		
Socio-Econ. Controls	-	-	Yes	-	Yes
Constant	-0.059***	-0.058***	0.350***	0.043	0.086*
	(0.008)	(0.006)	(0.014)	(0.036)	(0.044)
Observations	233574	233574	233574	233574	233574
# of People	35078	35078	35078	35078	35078
Adj. R Sq.	0.050	0.249	0.257	0.014	0.014

Notes: Controls are lagged excluding male, age, month of interview, and year by region. Additional controls include: (All columns) male, age, month of interview, year by region, education, potential experience and its square. Socio-Econ Controls include lagged: log of adjusted family income, self-reported health, marital status, parental status, and presence of a young child. Dummies for missing observations associated with income, and health were also included when those variables were included.
Standard errors in parentheses (clustered by individual)
Significance: * p<0.10 ** p<0.05 *** p<.01

The SWB-unemployed relationship remains statistically significant, with a reduced magnitude, as additional time-varying controls are added. Socio-economic controls including adjusted family income, self-reported health, marital and parental status were added in columns 3, and 5. The decline in magnitudes makes sense as each of the additional socio-economic controls mediate the effects of SWB on unemployment. Mediation occurs because people that report higher SWB have better health, are more productive, and are more likely to get married (De Neve et al. 2013). Self-reported health is an especially important mediator as they are both self-reported and highly correlated.

4.4.2 Heterogeneity of SWB – Unemployment Relation

There are reasons to believe the SWB – unemployed relation may vary across different dimensions. Krause (2013) found SWB was associated with reemployment in a quadratic manner and also that her SWB-reemployment relation was stronger for men. In particular she found that beyond a certain point, happier people were more likely to stay unemployed, and that happier men were more likely to exit unemployment into self-employment. One thing Krause is unable to test is whether the SWB-unemployment relation differs by employment status. It is plausible that the effect of SWB on becoming reemployed is different than on the effect of becoming unemployed. In three additional scenarios I allow for: 1) a quadratic SWB – unemployed relation, 2) differences by gender, and 3) differences by lagged unemployed status.

The scenario results reveal some important relations, presented in Table 4-2, but in each case, the main effect of SWB remains statistically significant and negative. The magnitudes are also similar to the main analysis that includes socio-economic controls. The first scenario results

(columns 1 and 2) reveal a strong quadratic SWB – unemployment relation. The marginal effect of increasing SWB on unemployment becomes positive (unemployment more likely) at standardized SWB values greater than 0.83 (DOLS) and 1.50 (FE).[42] Greater SWB reduces the likelihood of unemployment, but too much SWB leads to a higher likelihood of being unemployed. Krause (2013) suggests that it may be that unemployed people that are relatively highly satisfied with their lives may have less incentive to become reemployed. The analyses by gender, in columns 3 and 4, do not reveal different relations for men and women. The coefficient on the Male X SWB interaction term is not statistically significant.

The SWB-unemployed relation is substantively different for currently unemployed and employed people. The results from scenario 3 are presented in column 5. For currently unemployed people, a one standard deviation increase in lagged SWB is associated with a 1.8 percentage point decline in the likelihood of being unemployed, which is three times larger than the same relation for someone who is not unemployed. The result (1.8 = 100*(-0.012 -0.006)) comes from adding the statistically significant interaction term (Unemployed X Life Satisfaction) to the main effect (Life Sat. ST). Only the DOLS analysis is used because, as mentioned, estimating fixed effects and lagged unemployment in the same regression requires instrumental variable analysis to avoid bias.

[42] In the DOLS case, the partial derivative of unemployed status with respect to lagged SWB ($\partial U_{it} / \partial SWB_{it-1}$) = -0.005 + 0.006 SWB_{it-1}. Setting equal to zero, the turning point is 0.005/0.006 = 0.833.

Table 4-2 Heterogeneity of Unemployed - Life Satisfaction Relationship. Dependent Variable: Unemployed

	(1) DOLS	(2) FE	(3) DOLS	(4) FE	(5) DOLS
Life Sat. (ST)	-0.005***	-0.006***	-0.006***	-0.007***	-0.006***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Life Sat. Squared	0.003***	0.002***			
	(0.000)	(0.001)			
Male X Life Sat.			-0.002	-0.002	
			(0.001)	(0.002)	
Unemployed X Life Sat.					-0.012***
					(0.004)
Unemployed	0.436***		0.437***		0.430***
	(0.005)		(0.005)		(0.005)
Male	0.005***		0.005***		0.004***
	(0.001)		(0.001)		(0.001)
Socio-Econ. Controls	Yes	Yes	Yes	Yes	Yes
Constant	0.353***	0.102**	0.354***	0.107**	0.356***
	(0.014)	(0.046)	(0.014)	(0.046)	(0.014)
Observations	233574	233574	233574	233574	233574
# of People	35078	35078	35078	35078	35078
Adj. R Sq.	0.257	0.015	0.257	0.014	0.257

Notes: Controls are lagged excluding male, age, month of interview, and year by region. Additional controls include: (All columns) age, month of interview, year by region, education, potential experience and its square. Socio-Econ Controls include lagged: log of adjusted family income, self-reported health, marital status, parental status, and presence of a young child. Dummies for missing observations associated with income, and health were also included when those variables were included.
Standard errors in parentheses (clustered by individual)
Significance: * p<0.10 ** p<0.05 *** p<.01

4.4.3 Robustness - Additional Control Variables and Placebo Test

The primary analysis discussed above controls for fixed unobserved characteristics and time-varying characteristics affecting concurrent employment outcomes and income. However, there may still be other omitted time-varying factors or systematic measurement error in lagged SWB that causes bias. To address these issues additional control variables are added and a placebo (or falsification) test is used. The results support the conclusion that happier people are less likely to

be unemployed, in a robust fashion, but with the added qualification that job satisfaction represents one of the important mechanisms.

Additional Variables:– It is important to account for channels operating through SWB that may affect the likelihood of being unemployed directly. For example, an individual may have been unemployed in the past, which reduced SWB (Clark, Georgellis, and Sanfey 2001) and also reduced job opportunities directly. Alternatively an individual could be less happy because while currently employed, they know they are going to lose their job, or because they are not satisfied with their job and plan to quit (Clark 2001). Social capital (or networks) is another important channel. Happier people have greater social capital (Guven 2011) and social networks could lead to improved labor outcomes. To account for these channels, variables for unemployment history, job satisfaction and expectations, and social capital were added as controls. The length of time (tenure) in a current position was also added, as well as industry and occupation categories. The additional variables are defined in the Appendix C.2 and described briefly here.

Unemployment history is defined as the total length of time a person has been unemployed (in years). "JobFind Difficult" accounts for an individual's expectations of poor labor market conditions. Scaled 1 – 3 it takes greater values if the person believes it would be difficult to find a comparable job in the event they needed to. Job satisfaction is scaled from 0 – 10, taking greater values as satisfaction increases. Social capital is measured as a set of binary variables that take the value of one if the individual participated in an events or activities at least once in the last month. Events and activities include whether the participant: met with friends or relatives, visited with people in the community or at a bar, volunteered, participated in religious or sports events, and attended cultural or other entertainment events. Social capital variables

were omitted from the main analysis because the relevant questions were asked in only half of the years used for the main analysis.

The results presented in Table 4-3 show a declining magnitude for the lagged SWB-unemployed relation when including the additional controls, but it generally remains statistically significant. The relationship declines to -0.005 (Table 4-3, column 1) from -0.007 (Table 4-1, column 3) when adding controls for unemployment history, tenure, and industry and occupation categories. Further adding job market expectations and satisfaction reduces the relation to a significant -0.002 (Table 4-3, column 2). Adding job satisfaction as a control is a particularly strong test. Job satisfaction is highly correlated with life satisfaction (35%), which makes identifying separate relationships for each variable challenging. It requires a high degree of statistical power. Note that once again only the DOLS analysis is used when the included variables depend on employment status.

Adding the social capital variables does not change the relations much, even though the sample is reduced to approximately a third of the original. The DOLS and FE relations remain the same (compare Table 4-1, columns 3 and 5, with Table 4-3, columns 3 and 4). However, reducing the sample size when adding the additional job variables reduces the precision and statistical significance of the SWB-unemployed relation (contrast columns 2 and 5). As mentioned there is a high degree of collinearity of between life satisfaction and job satisfaction. I interpret the results as, happier people are less likely to be unemployed, but being happy at work is most important.

Table 4-3 Unemployed and Life Satisfaction Regressions with Additional Control Variables. Dependent Variable: Unemployed

	(1) DOLS	(2) DOLS	(3) FE	(4) DOLS	(5) DOLS	(6) DOLS
Life Sat. (ST)	-0.005***	-0.002***	-0.008***	-0.007***	-0.002	-0.001
	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)
Unemployed	0.387***	0.287***		0.431***	0.289***	0.289***
	(0.005)	(0.009)		(0.008)	(0.014)	(0.014)
Tenure (yrs)	-0.001***	-0.001***			-0.001***	-0.001***
	(0.000)	(0.000)			(0.000)	(0.000)
Unmpl. Hist	0.017***	0.016***			0.015***	0.015***
	(0.001)	(0.001)			(0.001)	(0.001)
JobFind Difficult		0.038***			0.042***	0.042***
		(0.002)			(0.003)	(0.003)
Job Satisfaction		-0.004***			-0.004***	-0.004***
		(0.000)			(0.001)	(0.001)
Socio-Econ. Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry & Occ.	Yes	Yes	-	-	Yes	Yes
Social Capital	-	-	Yes	Yes	-	Yes
Constant	0.204***	0.215***	0.131*	0.352***		
	(0.014)	(0.015)	(0.071)	(0.022)		
Observations	233574	233574	79870	79870	79870	79870
# of People	35078	35078	28590	28590	28590	28590
Adj. R Sq.	0.274	0.280	0.024	0.257	0.279	0.279
Soc. Cap. F stat.			0.939	7.088		3.728

Notes: Controls are lagged excluding male, age, month of interview, and year by region. Social Capital (Joint) is the linear combination of dummies for participation in various events that are described further in Appendix B.
Additional controls include: (All columns) male, age, month of interview, year by region, education, potential experience and its square. Socio-Econ Controls include lagged: log of adjusted family income, self-reported health, marital status, parental status, and presence of a young child. Industry and Occupation dummies are described further in Appendix C.2. Dummies for missing observations associated with income, health, and job satisfaction and expections were also included when those variables were included. Standard errors in parentheses (clustered by individual)
Significance: * p<0.10 ** p<0.05 *** p<.01

The relationships are in line with expectations. Those people who have been in their job longer are less likely to be unemployed in the future (Tenure). People who have been unemployed a greater amount of time are more likely to be unemployed again (Unempl. Hist.) as expected (Clark et al. 2008). Expecting it to be difficult to find a comparable job is negatively associated

(JobFind Difficult). People who are more satisfied in their jobs are also less likely to be unemployed. Greater social capital is related statistically to a lower likelihood of future unemployment in the DOLS regressions (Table 4-3, columns 4 and 6), but not the FE regression (column 3). Given the large number of social capital variables, the individual coefficients have been omitted from Table 4-3, but an F-stat for the joint significance is reported. The relationship magnitudes of the additional control variables should not be strongly interpreted. The variables were included to test the robustness of the SWB-unemployed relation, but are often collinear and potentially endogenous.

Placebo Test:–Some readers may be concerned that there is a systematic measurement error or an omitted variable related to satisfaction questions that drive the results. Placebo or falsification tests can be used to test this challenge. In particular the test replicates the main analyses using family satisfaction as an alternative explanatory variable to life satisfaction. Family satisfaction is used for two reasons. First, in theory family satisfaction is not a determinant of unemployment to the degree that life satisfaction is. Second, if measurement error present in satisfaction questions drives the life satisfaction – unemployed relation, then the same measurement error is likely to be present in family satisfaction.

Table 4-4 presents the results of the placebo test. Lagged family satisfaction is not related to unemployment once socio-economic controls or fixed effects have been included. This insignificant relation means that the life satisfaction – unemployed relation is not driven by measurement error or omitted variables related to satisfaction questions. Columns 1 – 5 directly correspond to the columns 1 – 5 of Table 4-1. They differ only by sample size and the use of family satisfaction instead of life satisfaction. Column 6 shows that life satisfaction is still a

significant determinant in the same sample and using the same specification as used for family satisfaction (column 5). The sample is reduced based on the availability of the family satisfaction question.

Table 4-4 Placebo Test: Unemployed and Family Satisfaction Regressions. Dependent Variable: Unemployed

	(1) OLS	(2) DOLS	(3) DOLS	(4) FE	(5) FE	(6) FE
Fam. Sat. (ST)	-0.009***	-0.004***	0.001	0.000	0.001	
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	
Life Sat. (ST)						-0.006***
						(0.001)
Socio-Econ. Controls	-	-	Yes	-	Yes	Yes
Constant	-0.077***	-0.059***	0.371***	0.124	0.115	0.095
	(0.010)	(0.008)	(0.019)	(0.086)	(0.095)	(0.095)
Observations	92430	92430	92430	92430	92430	92430
# of People	26999	26999	26999	26999	26999	26999

Notes: Controls are lagged excluding male, age, month of interview, and year by region. Additional controls include: (All columns) male, age, month of interview, year by region, education, potential experience and its square. Socio-Econ Controls include lagged: log of adjusted family income, self-reported health, marital status, parental status, and presence of a young child. Dummies for missing observations associated with income, and health were also included when those variables were included.
Standard errors in parentheses (clustered by individual)
Significance: * p<0.10 ** p<0.05 *** p<.01

4.4.4 Arellano and Bond's System Generalized Method of Moments

The results from the alternative Arellano and Bond approach confirm happier people are less likely to be unemployed. The approach has some benefits compared to the main analysis, but depends on certain conditions. Dynamics and fixed effects can both be accounted for in the same specification and the method allows for endogeneity of the regressors. The relationships are also considered causal. However, for the present paper, Arellano and Bond is used to support the

main results and not to advance a statistically identified causal relationship because it is debatable whether the necessary conditions are met.

Method Description:–To understand Arellano and Bond (1991) (referred to as "AB") it is useful to begin with Anderson and Hsiao (1981). To account for fixed effects Anderson and Hsiao apply first differences to Equation 4-1. First differences, however, cause the lagged differenced dependent variable to be related to the differenced error term. To overcome this problem, lagged differenced unemployment is predicted using an instrumental variable approach. Equation 4-2 presents the second-stage specification:

$$\Delta U_{it} = \rho\widehat{\Delta U_{it-1}} + \delta\Delta\widehat{SWB_{it-1}} + \boldsymbol{\beta}_0'\Delta\boldsymbol{X_{1,it}} + \boldsymbol{\beta}_1'\Delta\widehat{\boldsymbol{X_{2,it-1}}} + \Delta\varepsilon_{it} \qquad (4\text{-}2)$$

Where $\Delta U_{it} = U_{it} - U_{it-1}$ and $\widehat{\Delta U_{it-1}}$ is the predicted value for ΔU_{it-1}. Anderson and Hsiao (1981) suggest U_{it-2} as a valid instrument for ΔU_{it-1}. U_{it-1} is relevant because it correlated with ΔU_{it-1} and it is excludable (not correlated with $\Delta\varepsilon_{it}$) if there is no autocorrelation in the level equation 1 (i.e. $cov(\varepsilon_{it}, \varepsilon_{it-1}) = 0$). ΔSWB_{it-1} and $\Delta\boldsymbol{X_{2,it-1}}$ are also allowed to be endogenous and predicted in the same way as ΔU_{it-1}. Building on this approach, AB recognized that further lags could be used as additional instruments. For example, both U_{i1} and U_{i2} are valid instruments for ΔU_{i4}. For ΔU_{i5} even more instruments are available, namely: U_{i1}, U_{i2}, and U_{i3}. In this way, an additional instrument is added for each time period. Estimation of this structure is then performed using GMM. See Arellano and Bond (1991) for further details. The AB approach also allows for traditional exogenous instruments. To increase efficiency I also use "death of a partner" as an excluded instrument.

In the present context, there are challenges facing the AB approach. There is autocorrelation in the level equation 1 (i.e. $cov(\varepsilon_{it}, \varepsilon_{it-1}) \neq 0$), because there is serial

correlation present in unemployment, which means U_{it-2} will not be excludable. To reduce this problem, I use AB instruments that begin with lag order three (e.g. U_{it-3}), instead of two, for all of the endogenous variables. In this way the condition for the level relation is relaxed to $cov(\varepsilon_{it}, \varepsilon_{it-2}) = 0$. However, there may be different orders of serial correlation in the variables treated as endogenous (ΔU_{it-1}, ΔSWB_{it-1}, and $\Delta \boldsymbol{X_{2,it-1}}$) and tests are necessary to provide assurance that the exclusion restrictions are being met. I use the typical Hansen J test of over-identifying restrictions, and also a test that is specific to AB type models. Because the excluded instruments are lags of the endogenous variables, one can test their excludability by the degree of autocorrelation in the predicted residuals. It is expected that there is first-order autocorrelation in the predicted residuals from Equation 4-2 (i.e. $cov(\Delta\varepsilon_{it}, \Delta\varepsilon_{it-1}) \neq 0$) due to the mechanical relation between ΔU_{it-1} and U_{it-1}. However, there should be no second-order autocorrelation (i.e $cov(\Delta\varepsilon_{it}, \Delta\varepsilon_{it-2}) = 0$) for the instruments to be valid.

Results:–Greater life satisfaction is statistically associated with a lower likelihood of being unemployed across each of five different AB type regressions. The results are presented in Table 4-5. The relationship magnitudes increased substantially from approximately 0.01, in the main results, to approximately 0.04. The range of AB results is from -0.035 to -0.052, based on specifications that differ in several important ways. However, only the specifications in columns 3 and 4 pass the tests necessary for consistency, suggesting the 0.04 magnitude is the most reliable. Column 5 uses the column-4 analysis but with added socio-economic controls that are also allowed to be endogenous.

As mentioned, I present the AB results as support for the main analysis, but not to advance a statistically identified causal relationship. There is substantial serial correlation in both

unemployment and SWB, which challenges the excludability of the AB-type instruments. While the AR(2) and Hansen J test results support the AB models used in columns 3 and 4, the evidence from tests of exclusion restrictions is suggestive in nature, not conclusive. The remainder of the section describes the different specifications and test results in Table 4-5.

Table 4-5 Arellano and Bond Type GMM Estimation. Estimation Dependent Variable: ΔUnemployed. Relations Presented in Levels for Unemployed

	(1) AB	(2) AB	(3) Factor GMM	(4) Factor GMM	(5) Factor GMM
L Life Sat. (ST)	-0.035***	-0.035***	-0.040***	-0.044***	-0.052***
	(0.008)	(0.008)	(0.014)	(0.016)	(0.016)
L2 Life Sat. (ST)		-0.005	0.005	0.005	0.009
		(0.007)	(0.011)	(0.012)	(0.011)
L Unemployed	0.569***	0.238***	0.428***	0.436***	0.324***
	(0.029)	(0.038)	(0.084)	(0.122)	(0.080)
L2 Unemployed		0.240***	0.215***	0.171**	0.236***
		(0.029)	(0.061)	(0.081)	(0.054)
Socio-Econ. Controls	-	-	-	-	Yes
Observations	165974	165974	165974	165974	165974
Hansen J p-value	0.233	0.658	0.287	0.120	0.414
AR(1) p-value	0.000	0.000	0.000	0.000	0.000
AR(2) p-value	0.000	0.000	0.208	0.608	0.048
# of Instruments	731	910	225	132	237

Notes: AB is the traditional Arellano and Bond one-step GMM estimation. Factor GMM replaces the GMM-style instruments with their principal components Controls are lagged excluding male, age, month of interview, year, and region. Additional controls include: (All columns) male, age, month of interview, year, and region, education, potential experience and its square. Socio-Econ Controls include lagged: log of adjusted family income, self-reported health, marital status, parental status, and presence of a young child. Dummies for missing observations associated with income, and health were also included when those variables were included. Standard errors in parentheses (clustered by individual)
Significance: * p<0.10 ** p<0.05 *** p<.01

The different specifications are used primarily to obtain excludable instruments. Column 1 presents the results from the AB approach described above. The results from the AR(2) test results reveal the presence of second order autocorrelation in the error terms, indicating the model is not valid. Although the Hansen J suggests the instruments are excludable, the AR(2)

test is more reliable in the present case because the Hansen J test suffers from low power when there are many instruments (in this case more than 700). Column 2 adds the second lag of life satisfaction and unemployment as endogenos variables to help account for the serial correlation that is causing the AR(2) test to fail. However, while the Hansen J test improves, the AR(2) still fails.

The estimates in columns 3 and 4 are more reliable, because the AR(2) and Hansen J tests each suggest the models are correctly specified. Using Factor GMM, the endogenous variables are predicted using the factors of lagged values, but not the lagged values themselves, which seems to capture the previous serial correlation. Factor GMM replaces the AB instruments with their principal components. In particular, the 910 instruments used in column 2 are reduced to 225 components in column 3. Reducing the number of instruments improves efficiency and reduces problems associated with weak instruments. In column 4 the instruments are further reduced by limiting the number of lags that are used to obtain components. The original GMM instruments include lags three and higher depending on the period of observation (the number of lags used for an endogenous variable = t - 3 for $t \geq 4$). In column 4, only lags three, four, and five are allowed, and the components derived from these instruments number 132. See Kapetanios and Marcellino (2010) for an explanation of Factor GMM. Estimation is implemented using the Stata user written command xtabond2 (Roodman 2009).

4.5 Mechanisms – Character Skills

Character skills are likely to be one of the mechanisms through which SWB affects unemployment. ‘Character skills’ is a broad term used to describe “soft skills, personality traits, non-cognitive skills, non-cognitive abilities, character, and socio-emotional skills (Heckman and

Kautz 2013, 10)." They are usually measured using personality traits, especially the Big-Five personality measures: Openness to Experience, Conscientiousness, Extraversion, Agreeableness, and Neuroticism.[43] Other traits include optimism, locus of control, and reciprocity.

Character skills are interrelated with SWB. They are both determinants and outcomes of each other (Roberts, Caspi, and Moffitt 2003; Mohanty 2009b; Specht, Egloff, and Schmukle 2012; and Soto 2015). One study states, "that personality traits and well-being aspects reciprocally influence each other over time. (Soto 2015, 45)." A similar statement is also found in Roberts et al. (2003, 590). The relationship between SWB and the Big-Five personality traits is further supported using the GSOEP data. Specht, Egloff, and Schmukle (2012) shows that changes in the Big-Five affect changes in life satisfaction, and also that the relationship holds in reverse - changes in life satisfaction affect the Big-Five.

4.5.1 Past Evidence of Character Skills as a Mechanism

Character skills have become the subject of growing research in economics. Formal economic theory is being developed to include character skills but it is still in its infancy (Borghans et al. 2008). Intuitively from human capital theory, labor market outcomes depend on character skills because personality contributes to individuals' productive traits. Indeed performance and job sorting are partially explained by varying personality traits. For example, "[e]xtroversion was positively linked to job performance in management and sales occupations, (Mueller and Plug 2006, 6)."

Empirically, character skills predict a variety of outcomes even when traditional human capital measures, including IQ, have been controlled (Heckman and Kautz 2013, 4). In the SWB

[43] The Big-Five measures have become relatively well accepted, "[t]here are reliable ways to measure them, and there are proven ways to enhance them and to evaluate efforts to foster them. (Heckman and Kautz 2013, 5)"

literature, character skills are often suggested as a mechanism through which SWB affects labor outcomes: later life wages can be explained by "higher degrees of optimism and extraversion and less neuroticism (De Neve and Oswald 2012, 19957)." Mohanty (2009b) attributes positive attitude toward oneself as a channel, which is similar to locus of control. Likewise Krause (2013) uses "the concept of locus of control and the personality traits of neuroticism and extraversion" to explain happiness' effect on reemployment. Roberts, Caspi, and Moffitt (2003) also describes personality measures similar to neuroticism and social closeness as the most important traits predicting work outcomes.

While personality traits are often thought to be relatively fixed over time, recent literature has shown that is not the case. Indeed one of the studies that is responsible for the former view does not say personality traits are unchangeable (Costa and McCrae 1994, 22). Among their conclusions they say, "People surely grow and change, but they do so on the foundation of enduring dispositions (Costa and McCrae 1994, 36)." Recent research suggests dispositions change too, at least as measured using the Big-Five personality traits, which were shown to change throughout adulthood. "The Big Five traits are complex phenomena subject to a variety of developmental influences (Srivastava et al. 2003, 1041)." Furthermore, (Heckman and Kautz 2013) summarize the evidence for lasting benefits of interventions that aim to improve character skills, both in early childhood and workplace based. "[T]he answer to the question of whether the change in personality is possible must be a definite yes. (Borghans et al. 2008, 1020)"

4.5.2 Character Skills Operate as a Mechanism

Character skills are plausible mechanisms that help to explain the relationship between lagged SWB and unemployment. However, cognitive ability does not represent an omitted variable or

mechanism operating in the present context. Lagged SWB is partially explained by the Big-Five personality traits, optimism, reciprocity, and external locus of control, but not by two different measures of cognitive ability. The results hold whether controlling for employment variables or fixed effects. Not only do personality traits changer over time for a given individual, but they explain corresponding within-person changes in SWB. The results are presented in Table 4-6, but first a discussion of the methods is warranted.

There are many factors through which SWB could affect unemployment. As discussed in the results section, many of the control variables represent channels that mediate the effects of SWB. The remaining mechanisms must affect lagged SWB independently of the controls used in the main analysis. To test plausible factors, lagged SWB is regressed on the control variables used in equation 1 and additional variables representing plausible mechanism. Equation 4-3 presents the OLS specification as an example that corresponds to the main DOLS estimates. $\boldsymbol{M_{it-1}}$ is a vector of variables that may operate as mechanisms. Analogous fixed-effects regressions are also used.

$$SWB_{it-1} = \gamma_1 U_{it-1} + \boldsymbol{\beta}_2' \boldsymbol{X_{1,it}} + \boldsymbol{\beta}_3' \boldsymbol{X_{2,it-1}} + \boldsymbol{\gamma_2'} \boldsymbol{M_{it-1}} + \mu_{it} \qquad (4\text{-}3)$$

In Table 4-6, the OLS specifications correspond to the Table 4-3, column 2, DOLS regression. They include lagged socio-economic controls and all of the same employment variables. The FE regressions correspond to specification in Table 4-1, column 5, by excluding the lagged employment variables but including individual fixed effects. The personality and intelligence variables are standardized to facilitate comparison of their coefficients. The specific definitions are included in Appendix C.2. The columns test different variables because they are not all available in the same years.

The results, presented in Table 4-6, support the explanations that SWB affects labor market outcomes through increased extraversion and less neuroticism (De Neve and Oswald, 2012; Krause, 2013). Indeed each of the Big-Five personality traits are statistically related to SWB in the expected ways and consistent with past literature (Soto 2015). The pattern is similar whether using fixed effects or controlling for employment variables. Neuroticism (or emotional instability) is negatively related with SWB. The other Big-Five personality traits are positively and significantly related. While optimism is not included among the Big-Five, it shows the expected, highly significant and positive relationship with SWB. Changes in optimism also have the largest relationship with changes in SWB. Neuroticism has the next largest relationship.

Table 4-6, columns 3 and 4, show the results when using reciprocity and locus of control. The results may again be expected. Reciprocity is broken into positive reciprocity, when a person wants to repay good deeds, and negative, when someone desires to "get even" following negative events. It was not clear before hand what direction reciprocity would have with SWB[44], but it is not surprising that positive reciprocity is positively related to SWB, while negative has the opposite direction. Locus of control also has two dimensions that are treated separately. Greater *external* locus of control means the person believes outcomes are controlled more by more external factors. It is negatively related to SWB as expected. *Internal* locus of control relates more to personal control. It is omitted because internal consistency is low (Heineck and Anger 2010).

[44] To my knowledge there is little SWB research in economics that discusses reciprocity.

Table 4-6 Mechanisms: Lagged Life Satisfaction Regressions. Various years.[a]

	(1) OLS	(2) FE	(3) OLS	(4) FE	(5) OLS	(6) FE
Agreeable	0.049***	0.025**				
	(0.007)	(0.011)				
Conscientious	0.029***	0.044***				
	(0.008)	(0.012)				
Neuroticism	-0.093***	-0.109***				
	(0.007)	(0.012)				
Extraversion	0.042***	0.041***				
	(0.007)	(0.013)				
Openness	0.030***	0.029**				
	(0.008)	(0.012)				
Optimism	0.211***	0.153***				
	(0.007)	(0.010)				
Reciprocity (pos.)			0.080***	0.076***		
			(0.009)	(0.013)		
Reciprocity (neg.)			-0.027***	-0.016		
			(0.008)	(0.012)		
Ext. Locus of Control			-0.127***	-0.089***		
			(0.009)	(0.013)		
Symbol Test					-0.031	-0.059
					(0.031)	(0.040)
Word Fluency Test					0.003	0.033
					(0.027)	(0.039)
Socio-Econ. Controls	Yes	Yes	Yes	Yes	Yes	Yes
Employment Variables	Yes	-	Yes	-	Yes	-
Constant	-3.304***	-3.398***	-3.515***	-3.634***	-5.905***	-3.290
	(0.219)	(0.945)	(0.290)	(1.166)	(0.582)	(4.828)
Observations	20288	20288	12947	12947	1792	1792
# of People	10144	10144	6789	6789	896	896
Adj. R Sq.	0.401	0.111	0.365	0.080	0.323	0.094

a. Columns (1, 2): 2005 and 2009; (3, 4) 2005 and 2010; and (5, 6) 2006 and 2012.
Notes: Additional controls include: (all columns) male, age, month of interview, year, and region, education, potential experience and its square. Socio-Econ Controls include lagged: log of adjusted family income, self-reported health, marital status, parental status, and presence of a young child. Employment Variables include lagged: employment categories, tenure, unemployment history, JobFind Difficult, Job Satisfaction, and Industry and Occupation categories. Dummies for missing observations associated with income, health, job satisfaction and expectations were also included when those variables were included.
Standard errors in parentheses (clustered by individual)
Significance: * p<0.10 ** p<0.05 *** p<.01

Columns 5 and 6 include measures of cognitive ability as alternative mechanisms. Cognitive ability is measured using two tests with each representing different aspects of intelligence. The word fluency test is most comparable to measures of crystalized intelligence, which increases as the individual attains more knowledge through experience or education. It is also affected by fluid intelligence, which is related to the speed of cognition. The second test is the symbol correspondence test, which is most closely related to fluid intelligence.

Intelligence does not have a significant relationship with SWB when controlling for either the employment variables (column 5) or fixed effects (column 6). Note there is a high degree of correlation between the two and their relationships with SWB should not be interpreted independently. However, jointly they are also statistically insignificant (with a max F-stat of 1.2 in the FE regression).

4.5.3 Implications for Future Research

The results suggest traditional models of labor market performance should be expanded. Both character skills and SWB are important determinants of labor market outcomes and labor market equations should be adjusted accordingly. "Focusing on one dimension of human skills to the exclusion of other dimensions misses fundamental aspects of human performance and development (Heckman and Kautz, 2013, 5)." Although economic theories of wage determination, for example, have traditionally focused on cognitive ability, character skills should not be ignored. "For many outcomes, the predictive power of character skills rivals that of measures of cognitive ability (Heckman and Kautz 2013, 23)." Another study concludes that, "…the effects of psychological capital variables in predicting wages are even stronger than the effects of traditional human capital variables (Mohanty 2009a, 357)."

The literature supporting character skills as determinants of performance is greater than for SWB, but when measures of character skills are absent, SWB may suffice as a proxy. Obtaining personality measures in general surveys can be time-prohibitive, and many surveys do not include them. In such an instance, Guven (2011) suggests residual SWB as a proxy. Residual SWB is the portion of SWB that is not explained by observable life circumstances. Guven (2011) shows that residual SWB is the strongest predictor of optimism and suggests this finding as an "invaluable opportunity" to researchers. "… [O]ne can easily calculate residual happiness in these datasets and can use them as a variable that is highly correlated with optimism (Guven 2011, 180)." One can also use raw SWB, in contrast to residual SWB, with the same interpretation so long as they include controls for life circumstacnes.

While SWB may serve as a reasonable proxy for character skills, it is important to remember they are distinct. Self-esteem serves as an example. It is another trait that may be considered a character skill, and conceptually, is closely enough related to happiness to warrant direct comparison. In a theoretical and empirical investigation of the similarities between happiness and self-esteem the authors determine that while they are strongly correlated, they represent separate psychological constructs (Lyubomirsky, Tkach, and DiMatteo 2006). Also remember that the effects of SWB are not mediated solely by character skills, SWB affects additional channels too (e.g. positive affect's effect on productivity, Oswald et al. 2015).

4.6 Conclusions

Recent research has begun to use psychological variables to measure important dimensions of labor performance. Support for so called "character skills" as drivers of numerous outcomes is increasing in both empirical studies and economic theory. Character skills are typically measured

using personality traits, such as the Big-Five traits, but personality and alternative measures are not frequently available. This paper suggests subjective well-being (SWB) as a more widely available psychological measure that can be used in analyzing the determinants of unemployment.

This paper contributes to both the labor economics and the economics of happiness literature. The main results demonstrate that people reporting higher SWB are less likely to be unemployed, and the relationships have meaningful magnitudes as well. A one standard deviation improvement in SWB is associated with approximately a one-percentage point decrease in the likelihood of being unemployed in Germany. The effects can be explained in part by character skills. Additional analysis shows that improvements in an individual's character skills, such as reduced neuroticism, are associated with increased SWB in a fixed-effects regression with complete socio-economic controls.

There are two important variations to the SWB-unemployed relation. First, too much SWB can be a bad thing. The SWB-unemployed relation is quadratic and the marginal effect of increasing SWB on unemployment becomes positive (unemployment more likely) at standardized SWB values greater than 0.83 (DOLS) and 1.50 (FE). Second, higher SWB has a greater impact on getting hired than on staying employed. The SWB-unemployed relation is three times larger for people who are currently unemployed. Obtaining the relation for employed people is a new finding because previous studies have worked with samples of unemployed people (e.g. Krause 2013).

This study identifies the effects of SWB net of interrelationships with traditional human capital variables. These channels are captured when including a full range of controls in separate dynamic and fixed-effects regressions. It is difficult to conceive of any omitted channels or

alternative sources of bias. Identification comes from time-varying shocks to SWB, excluding the effects of individuals' job satisfaction, job expectations, unemployment history, family income, industry and occupation, social networks, and self-reported health. A placebo test is used to demonstrate the results are not driven by systematic measurement error or omitted variables specifically related to satisfaction type questions. Finally, Arellano and Bond (1991) GMM regressions support the main results. AB regressions are used to simultaneously include fixed-effect and dynamics, and to account for endogeneity. Most of the literature uses dynamic regressions, some condition on a similarly rich set of observables, but there is limited use of fixed effects.

Future research should include variables like SWB in analyzing dimensions of labor performance. There is substantial support for the use of personality traits in labor equations (e.g. Borghans et al. 2008; and Heckman and Kautz 2013), but when personality is not available, SWB is demonstrated here as an alternative. Another implication is for policy makers. Policies focused on character skill development will not only improve well-being, but also labor market performance.

Chapter 5 Summary and Conclusions

The goal of social policy is to improve societal well-being. The focus of this dissertation is on democratic development, as indirectly important for well-being, and second, subjective well-being (SWB). Quality institutions are necessary to implement SWB-improving policies, and we also need to know what can be done to improve SWB. SWB measures are valuable because they include economic and non-economic factors that are otherwise difficult to measure. Moreover greater SWB is associated with improved outcomes that economists are traditionally interested in. Chapter 4 demonstrates that greater SWB leads to a lower likelihood of being unemployed.

In Chapter 2, two coauthors and I contribute to the political variant of the resource curse debate generally, and especially in relation to two prominent papers (Haber and Menaldo 2011; Andersen and Ross 2014). Proponents of the resource curse suggest it exists under certain conditions, such as in the Middle East and North Africa, or in the period post 1980; however, under these conditions we do not find a significant relation using the most up-to-date time-series econometrics. We also estimate the relation for two groups comprised solely of producers, mature and less-experienced producers; yet even there, we do not find evidence to support the curse.

The results of Chapter 2 suggest increasing oil abundance need not hinder democratic development based on a sample of 127 countries. Countries with increasing oil abundance face challenges, such as increased revenue volatility or rent-seeking behavior, that may make policy planning difficult or increase corruption. Yet the evidence suggests the challenges have been manageable to the extent they did not hinder development of democratic institutions. Consequently, increasing oil abundance does not likely hinder social policy.

Chapter 3 shows the Great Recession had a large effect on SWB, primarily operating through reduced income and employment, and the effects differed substantially for different demographic groups. The results also provide an example of why social policy should be concerned with SWB. While young adults (18-24) are vulnerable to job loss, the SWB data reveal they were not the greatest impacted. The foreign born faced a decline about three-times larger than the full population and more than seven-times greater than young adults. The unemployment rate increased by less than two percentage points for young adults and for the foreign-born, by more than five percentage points. The SWB data suggest that while vulnerable to job loss, young adults are better able to cope, perhaps by enrolling in school and or living with their parents. Policymakers can learn from young-adults' experience, and perhaps provide better income support to undertake high-quality training programs. The results are based on microeconometric regressions, including macro-controls, and data from the General Social Survey for the years 1973-2014.

Chapter 4 establishes happier people are less likely to be unemployed using longitudinal data in Germany for the years 1996-2013 from the German Socio-Economic Panel (GSOEP). The relationship: has a meaning magnitude, is quadratic, has a larger magnitude for the unemployed, cannot be explained by omitted fixed variables, nor is it likely to be explained by reverse causality or measurement error. The panel structure controls for fixed characteristics and unemployment dynamics. The GSOEP data also includes a large number of characteristics that are used to further substantiate the main results, including family satisfaction (used in the placebo test), labor market expectations (used to account, in part, for reverse causality), and the Big-Five personality traits. The analysis demonstrates that personality changes over the period 2005-2009 in a way that is positively correlated with changes in SWB.

The results in Chapters 3 and 4 suggest the possibility of generating a virtuous cycle in social policy. Improving SWB is associated with lower unemployment, which is in turn positively associated with greater SWB. The cycle could be initiated through character skill development in occupational and educational structures. The results in Chapter 4 demonstrate that character skills, such as extraversion and emotional stability, are positively related to SWB. Greater SWB is likely to improve employment outcomes for many reasons. However, I focus on character skills (using personality as a measurable proxy) in part because there is complementary research that shows character skills can be trained and that they exhibit a positive relationship with labor market outcomes. Additional research should be conducted to understand which occupational and educational structures are better for SWB and to develop better training programs.

Social policy should be informed by SWB data. SWB measures reveal otherwise unobserved outcomes. It was not anticipated that young adults would represent the success story during the Great Recession, but SWB data indicate they were affected the least. Greater SWB also leads to a lower likelihood of being unemployed. Policies aimed at improving SWB will have the indirect effect of improving labor market outcomes as well. Last, the institutions necessary to implement SWB-improving policies are not likely to be affected by increasing oil abundance.

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Appendix A Supplementary Material for Chapter 2

Appendix Table A-1 Summary Statistics

		Polity		Polcon		CL		PR	
Group	Countries	1980	2005	1980	2005	1980	2005	1980	2005
Full Sample	127	-1.65	3.83	0.15	0.26	3.64	4.65	3.63	4.51
Mature	41	-1.05	3.73	0.17	0.26	3.90	4.56	3.93	4.49
Less-Experience	43	-1.56	3.81	0.17	0.28	3.63	4.86	3.58	4.72
Non-Producer	43	-2.33	3.93	0.10	0.23	3.40	4.53	3.40	4.33
Latin America	23	-0.57	7.17	0.17	0.30	4.09	5.13	4.00	5.22
MENA	18	-6.56	-3.61	0.04	0.16	2.78	2.89	2.78	2.56
ROW	86	-0.92	4.49	0.17	0.27	3.70	4.90	3.71	4.73

		Oil & Gas Value pc		GDP pc	
Group	Countries	1980	2005	1980	2005
Full Sample	127	2007	1438	5084	7456
Mature	41	5875	3278	8656	10476
Less-Experience	43	327	1122	5034	8971
Non-Producer	43	0	0	1728	3061
Latin America	23	656	700	2876	3527
MENA	18	11912	6165	10156	9472
ROW	86	296	647	4612	8085

Note: Oil was discovered before 1959 in Mature countries.
Source: Freedom House (2013), Geo-Help Inc. (2011), Heston et al. (2012), Polcon (2012), Polity (2011), Ross and Mahdavi (2015), World Bank (1995; 2013).

Appendix Table A-2 Oil & Gas Value's Impact on Polity by Country Group CS-EC Mean Group Regressions

	(1) Full Sample	(2) Mature	(3) Low-Exp	(4) Latin America	(5) MENA	(6) ROW
Lag Polity	-0.499***	-0.279***	-0.489***	-0.454***	-0.421***	-0.461***
	[-12.203]	[-4.023]	[-8.285]	[-5.063]	[-4.056]	[-9.056]
Lag Δ Polity	0.158***	0.030	0.189***	0.102	0.148+	0.114***
	[6.194]	[0.487]	[4.621]	[1.194]	[1.867]	[4.674]
Lag2 Δ Polity	0.038+	-0.002	0.071+	0.054	0.193**	-0.021
	[1.719]	[-0.036]	[1.869]	[0.660]	[2.820]	[-0.919]
Lag ln(O&G Value pc)	-0.020	0.046	-0.031	-0.718	-0.257	-0.112
	[-0.196]	[0.093]	[-0.389]	[-1.609]	[-0.887]	[-1.123]
Δ ln(O&G Value pc)	-0.155	-1.048+	-0.057	-0.542*	-0.109	-0.233*
	[-1.637]	[-1.868]	[-0.428]	[-1.995]	[-0.362]	[-2.015]
LagΔ ln(O&G Value pc)	-0.148	-0.487	-0.146	-0.536	0.056	-0.103
	[-1.013]	[-0.853]	[-0.682]	[-0.634]	[0.259]	[-0.624]
Lag2Δ ln(O&G Value pc)	-0.172	-0.678	-0.094	-0.553	0.095	-0.108
	[-1.559]	[-1.032]	[-1.146]	[-0.958]	[0.941]	[-1.355]
Polity Mean	1.040***	0.822***	0.951***	1.064***	0.998*	0.973***
	[4.878]	[3.396]	[3.452]	[3.906]	[1.999]	[4.346]
Lag Polity Mean	-0.451	-0.467	-0.527	-0.539+	-0.711	-0.481
	[-1.638]	[-1.521]	[-1.562]	[-1.701]	[-1.326]	[-1.389]
Lag2 Polity Mean	0.077	-0.159	0.176	-0.032	0.048	0.215
	[0.322]	[-0.615]	[0.473]	[-0.103]	[0.170]	[0.685]
Lag3 Polity Mean	0.126	0.426+	0.142	0.111	0.451+	-0.001
	[0.791]	[1.907]	[0.584]	[0.548]	[1.880]	[-0.005]
ln(O&G) mean	0.202	1.029*	0.065	0.728	0.194	0.272
	[0.996]	[2.068]	[0.414]	[0.923]	[0.619]	[1.166]
Lag ln(O&G) mean	-0.089	-0.689	-0.102	1.107	0.021	-0.164
	[-0.327]	[-1.025]	[-0.402]	[0.584]	[0.061]	[-0.634]
Lag2 ln(O&G) mean	0.151	0.217	0.158	0.199	0.103	0.100
	[0.644]	[0.469]	[0.537]	[0.276]	[0.330]	[0.387]
Lag3 ln(O&G) mean	-0.605**	-0.903	-0.251	-0.968	0.205	-0.378*
	[-2.756]	[-1.349]	[-1.283]	[-0.855]	[0.562]	[-2.023]
Constant	-1.295	0.812	-1.449*	4.500	-0.853	-1.645*
	[-1.512]	[0.336]	[-2.524]	[1.375]	[-0.420]	[-2.028]
Long-Run Effect	-0.040	0.164	-0.063	-1.582	-0.609	-0.243
	[-0.196]	[0.093]	[-0.390]	[-1.469]	[-0.957]	[-1.125]
Observations	4438	1434	1500	805	629	3004
Periods - Avg.	35	35	35	35	35	35
Countries	127	41	43	23	18	86

Note: Mean group allows heterogeneous short- and long-run relations by country. CS-ECM – cross-sectionally augmented error correction model (Equation 3 in the text). Oil & Gas value per capita are used in natural log form. Polity scaled from -10 (autocracy) to 10 (democracy). Group composition presented in Table A8.
t statistics in brackets; * p<0.05 ** p<.01 *** p<.001
Source: Geo-Help Inc. (2011), Heston et al. (2012), Polity (2011), Ross and Mahdavi (2015), World Bank (1995; 2013).

Appendix Table A-3 Oil & Gas Value's Impact on Polcon by Country Group. CS-EC Mean Group Regressions

	(1) Full Sample	(2) Mature	(3) Low-Exp	(4) Latin America	(5) MENA	(6) ROW
Lag Polcon	-0.572***	-0.523***	-0.640***	-0.594***	-0.362***	-0.611***
	[-13.796]	[-10.275]	[-6.854]	[-10.917]	[-4.471]	[-10.965]
Lag Δ Polcon	0.165***	0.182***	0.179***	0.198***	0.170***	0.167***
	[7.031]	[4.981]	[4.253]	[6.520]	[3.817]	[5.688]
Lag2 Δ Polcon	0.087***	0.124***	0.112*	0.137***	0.145***	0.120***
	[4.521]	[4.240]	[2.548]	[4.072]	[3.394]	[4.749]
Lag ln(O&G Value pc)	0.002	0.015	-0.001	-0.017	0.000	-0.004
	[0.323]	[0.637]	[-0.067]	[-0.381]	[0.006]	[-0.513]
Δ ln(O&G Value pc)	0.002	0.034	-0.014*	-0.014	0.009	0.006
	[0.327]	[1.243]	[-2.162]	[-0.343]	[0.734]	[0.932]
LagΔ ln(O&G Value pc)	-0.000	0.053	-0.012+	0.012	-0.011	0.006
	[-0.032]	[1.503]	[-1.765]	[0.684]	[-0.808]	[0.970]
Lag2Δ ln(O&G Value pc)	0.009	0.006	0.001	0.029	0.004	0.013
	[1.075]	[0.267]	[0.073]	[1.302]	[0.564]	[1.582]
Polcon Mean	0.950***	1.098***	0.998***	1.048***	0.893**	1.023***
	[4.501]	[4.352]	[4.170]	[3.778]	[2.937]	[4.697]
Lag Polcon Mean	-0.376	-0.497+	-0.526*	-0.485+	-0.705**	-0.511*
	[-1.566]	[-1.747]	[-2.358]	[-1.836]	[-2.996]	[-1.996]
Lag2 Polcon Mean	0.194	-0.127	0.271	-0.156	0.082	0.164
	[0.822]	[-0.404]	[1.015]	[-0.540]	[0.452]	[0.698]
Lag3 Polcon Mean	-0.093	0.205	-0.016	0.223	0.180	-0.039
	[-0.532]	[0.895]	[-0.069]	[1.013]	[1.070]	[-0.204]
ln(O&G) mean	0.004	-0.032	0.003	0.020	-0.009	-0.003
	[0.342]	[-0.919]	[0.314]	[0.224]	[-0.517]	[-0.219]
Lag ln(O&G) mean	0.004	-0.034	0.004	-0.006	0.027	0.005
	[0.301]	[-0.819]	[0.296]	[-0.116]	[1.302]	[0.329]
Lag2 ln(O&G) mean	-0.008	0.044	-0.005	-0.041	-0.023	-0.002
	[-0.528]	[0.969]	[-0.285]	[-0.794]	[-0.976]	[-0.126]
Lag3 ln(O&G) mean	-0.004	-0.009	-0.003	0.038	0.003	0.005
	[-0.307]	[-0.350]	[-0.242]	[1.019]	[0.267]	[0.355]
Constant	-0.028	0.075	-0.006	0.156	-0.008	0.029
	[-0.569]	[0.491]	[-0.085]	[0.406]	[-0.111]	[0.434]
Long-Run Effect	0.003	0.029	-0.001	-0.029	0.000	-0.006
	[0.323]	[0.632]	[-0.067]	[-0.385]	[0.006]	[-0.511]
Observations	4557	1475	1537	828	643	3086
Periods - Avg.	36	36	36	36	36	36
Countries	127	41	43	23	18	86

Note: Mean group allows heterogeneous short- and long-run relations by country. CS-ECM – cross-sectionally augmented error correction model (Equation 3 in the text). Oil & Gas value per capita are used in natural log form. Polcon scaled 0-1, with increasing values indicating greater constraints. Group composition presented in Table A8.
t statistics in brackets; * p<0.05 ** p<.01 *** p<.001
Source: Geo-Help Inc. (2011), Heston et al. (2012), Polcon (2012), Ross and Mahdavi (2015), World Bank (1995; 2013).

Appendix Table A-4 Oil & Gas Value's Impact on Civil Liberties by Country Group CS-EC Mean Group Regressions

	(1) Full Sample	(2) Mature	(3) Low-Exp	(4) Latin America	(5) MENA	(6) ROW
Lag Political Rights	-0.451***	-0.488***	-0.538***	-0.494***	-0.768***	-0.477***
	[-15.656]	[-9.563]	[-8.249]	[-7.071]	[-6.575]	[-11.486]
Lag Δ Political Rights	0.154***	0.190***	0.181***	0.051	0.288**	0.135***
	[7.221]	[5.970]	[4.149]	[1.038]	[3.075]	[5.206]
Lag2 Δ Political Rights	0.114***	0.070*	0.152***	0.036	0.183**	0.091***
	[5.661]	[2.288]	[3.520]	[0.823]	[2.822]	[3.888]
Lag ln(O&G Value pc)	-0.038	0.034	-0.015	-0.252+	0.024	-0.040
	[-0.853]	[0.140]	[-0.253]	[-1.884]	[0.198]	[-1.044]
Δ ln(O&G Value pc)	0.012	0.050	0.002	-0.125	0.110	-0.004
	[0.311]	[0.270]	[0.059]	[-0.647]	[1.572]	[-0.161]
LagΔ ln(O&G Value pc)	-0.032	-0.249	-0.047	0.158	-0.087	-0.001
	[-0.867]	[-1.199]	[-0.822]	[0.963]	[-0.708]	[-0.025]
Lag2Δ ln(O&G Value pc)	0.028	0.201	-0.026	0.095	0.043	0.008
	[0.706]	[1.521]	[-0.421]	[0.870]	[0.341]	[0.214]
PR Mean	0.837***	1.111***	0.971***	1.000***	0.886***	0.915***
	[4.415]	[4.268]	[3.602]	[3.736]	[3.629]	[4.836]
Lag PR Mean	-0.607*	-0.549*	-0.629+	-0.469	-0.433*	-0.530*
	[-2.472]	[-2.021]	[-1.940]	[-1.599]	[-2.389]	[-2.457]
Lag2 PR Mean	0.024	0.199	0.311	0.112	0.163	0.028
	[0.095]	[0.717]	[1.218]	[0.755]	[0.739]	[0.105]
Lag3 PR Mean	0.168	-0.085	-0.002	-0.107	0.246	0.149
	[0.924]	[-0.365]	[-0.008]	[-0.491]	[1.224]	[0.804]
ln(O&G) mean	0.004	-0.181	-0.016	0.134	-0.120	0.015
	[0.050]	[-1.029]	[-0.263]	[0.368]	[-1.146]	[0.182]
Lag ln(O&G) mean	0.090	0.254	0.006	-0.213	0.114	0.016
	[0.984]	[1.345]	[0.078]	[-0.551]	[0.729]	[0.175]
Lag2 ln(O&G) mean	-0.067	-0.447+	0.001	0.056	-0.118	0.007
	[-0.782]	[-1.949]	[0.010]	[0.266]	[-0.533]	[0.104]
Lag3 ln(O&G) mean	-0.014	0.217	-0.008	0.158	0.064	-0.022
	[-0.190]	[1.491]	[-0.138]	[0.653]	[0.374]	[-0.311]
Constant	-0.077	-0.252	-0.993	1.671	-0.430	-0.658
	[-0.116]	[-0.205]	[-1.230]	[0.925]	[-0.442]	[-0.964]
Long-Run Effect	-0.083	0.070	-0.029	-0.510+	0.032	-0.085
	[-0.860]	[0.140]	[-0.254]	[-1.837]	[0.198]	[-1.047]
Observations	4566	1475	1544	828	648	3090
Periods - Avg.	36	36	36	36	36	36
Countries	127	41	43	23	18	86

Note: Oil & Gas value per capita are used in natural log form. Civil liberties are scaled from 1 to 7 with more 7 indicating greater civil liberties. Group composition presented in Table A8.
t statistics in brackets; * p<0.05 ** p<.01 *** p<.001
Source: Freedom House (2013), Geo-Help Inc. (2011), Heston et al. (2012), Ross and Mahdavi (2015), World Bank (1995; 2013).

Appendix Table A-5 Oil & Gas Value's Impact on Political Rights by Country Group CS-EC Mean Group Regressions

	(1) Full Sample	(2) Mature	(3) Low-Exp	(4) Latin America	(5) MENA	(6) ROW
Lag Political Rights	-0.390***	-0.427***	-0.439***	-0.467***	-0.623***	-0.427***
	[-16.179]	[-9.525]	[-8.610]	[-8.228]	[-7.185]	[-12.722]
Lag Δ Political Rights	0.119***	0.154***	0.138***	0.041	0.210***	0.105***
	[6.758]	[5.246]	[4.276]	[1.025]	[3.737]	[4.944]
Lag ln(O&G Value pc)	0.002	0.045	-0.016	-0.188+	0.052	-0.007
	[0.050]	[0.222]	[-0.457]	[-1.700]	[0.677]	[-0.246]
Δ ln(O&G Value pc)	0.024	0.010	0.021	-0.164	0.166*	-0.001
	[0.661]	[0.060]	[0.774]	[-0.941]	[2.202]	[-0.038]
LagΔ ln(O&G Value pc)	-0.056+	-0.359+	-0.049	0.076	-0.110	-0.029
	[-1.711]	[-1.877]	[-1.506]	[0.656]	[-1.059]	[-0.859]
PR Mean	0.893***	1.049***	0.973***	1.045***	0.876***	0.922***
	[4.918]	[4.130]	[4.026]	[4.035]	[3.672]	[4.851]
Lag PR Mean	-0.612*	-0.549*	-0.683*	-0.480+	-0.570*	-0.521*
	[-2.505]	[-2.098]	[-2.267]	[-1.696]	[-2.472]	[-2.446]
Lag2 PR Mean	0.110	0.227	0.428+	0.071	0.248	0.074
	[0.440]	[0.816]	[1.728]	[0.421]	[1.001]	[0.280]
Lag3 PR Mean	0.032	-0.175	-0.223	-0.117	0.077	0.065
	[0.182]	[-0.755]	[-1.299]	[-0.565]	[0.484]	[0.359]
ln(O&G) mean	-0.024	-0.102	-0.034	0.244	-0.125	0.030
	[-0.343]	[-0.621]	[-0.646]	[0.702]	[-1.167]	[0.411]
Lag ln(O&G) mean	0.085	0.315+	0.061	-0.194	0.175	0.021
	[0.938]	[1.730]	[0.781]	[-0.600]	[1.062]	[0.234]
Lag2 ln(O&G) mean	-0.080	-0.366+	-0.046	0.094	-0.151	-0.039
	[-1.040]	[-1.758]	[-0.611]	[0.473]	[-0.775]	[-0.559]
Lag3 ln(O&G) mean	-0.025	0.004	0.013	-0.037	0.046	-0.030
	[-0.430]	[0.073]	[0.228]	[-0.252]	[0.436]	[-0.482]
Constant	-0.476	-0.077	-0.624	1.139	-0.234	-0.863
	[-0.797]	[-0.071]	[-0.983]	[0.742]	[-0.294]	[-1.528]
Long-Run Effect	0.005	0.104	-0.037	-0.402+	0.083	-0.017
	[0.050]	[0.223]	[-0.456]	[-1.692]	[0.693]	[-0.246]
Observations	4571	1476	1547	828	648	3095
Periods - Avg.	36	36	36	36	36	36
Countries	127	41	43	23	18	86

Note: Oil & Gas value per capita are used in natural log form. Political Rights are scaled from 1 to 7 with 7 indicating greater political rights. Group composition presented in Table A8.
t statistics in brackets; * p<0.05 ** p<.01 *** p<.001
Source: Freedom House (2013), Geo-Help Inc. (2011), Heston et al. (2012), Ross and Mahdavi (2015), World Bank (1995; 2013)

Appendix Table A-6 Test for Integration Order of Polity, Polcon Civil Liberties, Political Rights, and Oil & Gas Value

Variable	Test Statistic (p-values)	Full Sample	Mature	Low-Exp.	LAC	MENA	ROW
O&G Value	Chi-Squared P	1.000	1.000	0.106	0.997	1.000	1.000
	Inverse Logit L	1.000	1.000	0.601	0.978	1.000	0.959
	Inverse Normal Z	1.000	1.000	0.758	0.992	1.000	0.966
	Modified Inverse Chi-Sq.	1.000	1.000	0.101	0.988	0.998	1.000
	Unit Root Support	Yes	Yes	Yes	Yes	Yes	Yes
Δ O&G Value	Chi-Squared P	0.000	0.004	0.000	0.898	0.014	0.000
	Inverse Logit L	0.000	0.000	0.000	0.035	0.004	0.000
	Inverse Normal Z	0.000	0.000	0.000	0.030	0.002	0.000
	Modified Inverse Chi-Sq.	0.000	0.001	0.000	0.888	0.007	0.000
	Stationary in Diffs	Yes	Yes	Yes	Yes/No	Yes	Yes

Variable	Test Statistic (p-values)	Full Sample	Mature	Low-Exp.	LAC	MENA	ROW
Polity	Chi-Squared P	0.112	0.999	0.001	0.000	0.914	0.969
	Inverse Logit L	0.027	0.637	0.029	0.000	0.818	0.481
	Inverse Normal Z	0.394	0.625	0.729	0.023	0.801	0.650
	Modified Inverse Chi-Sq.	0.110	0.996	0.000	0.000	0.901	0.962
	Unit Root Support	Yes	Yes	Low	No	Yes	Yes
Δ Polity	Chi-Squared P	0.000	0.075	0.000	0.000	0.041	0.000
	Inverse Logit L	0.000	0.000	0.000	0.000	0.001	0.000
	Inverse Normal Z	0.000	0.000	0.000	0.000	0.001	0.000
	Modified Inverse Chi-Sq.	0.000	0.068	0.000	0.000	0.029	0.000
	Stationary in Diffs	Yes	Yes	Yes	Yes	Yes	Yes

Variable	Test Statistic (p-values)	Full Sample	Mature	Low-Exp.	LAC	MENA	ROW
Polcon	Chi-Squared P	0.000	0.834	0.001	0.053	0.999	0.000
	Inverse Logit L	0.011	0.554	0.009	0.118	0.625	0.013
	Inverse Normal Z	0.312	0.577	0.363	0.155	0.643	0.428
	Modified Inverse Chi-Sq.	0.000	0.834	0.000	0.042	0.993	0.000
	Unit Root Support	Low	Yes	Low	Yes	Yes	Low
Δ Polcon	Chi-Squared P	0.000	0.000	0.000	0.000	0.251	0.000
	Inverse Logit L	0.000	0.000	0.000	0.000	0.002	0.000
	Inverse Normal Z	0.000	0.000	0.000	0.000	0.001	0.000
	Modified Inverse Chi-Sq.	0.000	0.000	0.000	0.000	0.268	0.000
	Stationary in Diffs	Yes	Yes	Yes	Yes	Yes/No	Yes

Variable	Test Statistic (p-values)	Full Sample	Mature	Low-Exp.	LAC	MENA	ROW
CL	Chi-Squared P	0.063	0.584	0.018	0.000	0.217	0.982
	Inverse Logit L	0.045	0.343	0.020	0.000	0.426	0.574
	Inverse Normal Z	0.186	0.327	0.235	0.015	0.393	0.591
	Modified Inverse Chi-Sq.	0.058	0.603	0.012	0.000	0.229	0.976
	Unit Root Support	Low	Yes	Low	No	Yes	Yes
Δ CL	Chi-Squared P	0.000	0.000	0.000	0.000	0.000	0.000
	Inverse Logit L	0.000	0.000	0.000	0.000	0.000	0.000
	Inverse Normal Z	0.000	0.000	0.000	0.000	0.000	0.000
	Modified Inverse Chi-Sq.	0.000	0.000	0.000	0.000	0.000	0.000
	Stationary in Diffs	Yes	Yes	Yes	Yes	Yes	Yes

Variable	Test Statistic (p-values)	Full Sample	Mature	Low-Exp.	LAC	MENA	ROW
PR	Chi-Squared P	0.000	0.988	0.000	0.000	0.887	0.000
	Inverse Logit L	0.000	0.903	0.000	0.000	0.943	0.005
	Inverse Normal Z	0.064	0.904	0.024	0.001	0.939	0.155
	Modified Inverse Chi-Sq.	0.000	0.980	0.000	0.000	0.877	0.000
	Unit Root Support	No	Yes	No	No	Yes	No
Δ PR	Chi-Squared P	0.000	0.000	0.000	0.000	0.000	0.000
	Inverse Logit L	0.000	0.000	0.000	0.000	0.000	0.000
	Inverse Normal Z	0.000	0.000	0.000	0.000	0.000	0.000
	Modified Inverse Chi-Sq.	0.000	0.000	0.000	0.000	0.000	0.000
	Stationary in Diffs	Yes	Yes	Yes	Yes	Yes	Yes

Note: Dickey Fuller, Fisher style panel unit root tests (Choi 2001). The null hypothesis is that all panels contain a unit root. Oil & Gas value per capita are used in natural log form.
Source: Freedom House (2013), Geo-Help Inc. (2011), Heston et al. (2012), Ross and Mahdavi (2015), World Bank (1995; 2013)

Appendix Table A-7 Cointegration Results, Westerlund Panel Tests. Restricted Sample - 52 Countries

Polity	Full Sample	Mature	Low-Exp.	LAC	MENA	ROW
Group Mean Test t	0.54	0.70	0.22	0.98	0.14	0.26
Group Mean Test a	0.16	0.74	0.08	1.00	0.24	0.12
Panel Test t	0.28	0.34	0.46	0.86	0.32	0.28
Panel Test a	0.26	0.24	0.26	0.68	0.24	0.22
Cointegration Support	No	No	Some	No	No	No
Polcon	**Full Sample**	**Mature**	**Low-Exp.**	**LAC**	**MENA**	**ROW**
Group Mean Test t	0.12	0.10	0.46	0.64	0.42	0.06
Group Mean Test a	0.20	0.06	0.22	0.46	0.46	0.10
Panel Test t	0.06	0.16	0.08	0.34	0.34	0.06
Panel Test a	0.04	0.10	0.06	0.28	0.32	0.06
Cointegration Support	Yes	Some	Yes	No	No	Yes
Civil Liberties	**Full Sample**	**Mature**	**Low-Exp.**	**LAC**	**MENA**	**ROW**
Group Mean Test t	0.04	0.04	0.12	0.00	0.14	0.30
Group Mean Test a	0.08	0.04	0.12	0.10	0.00	0.28
Panel Test t	0.10	0.02	0.18	0.08	0.32	0.26
Panel Test a	0.04	0.00	0.22	0.06	0.04	0.28
Cointegration Support	Yes	Yes	No	Yes	Yes	No
Political Rights	**Full Sample**	**Mature**	**Low-Exp.**	**LAC**	**MENA**	**ROW**
Group Mean Test t	0.00	0.04	0.04	0.20	0.02	0.02
Group Mean Test a	0.04	0.06	0.08	0.30	0.02	0.22
Panel Test t	0.12	0.04	0.26	0.18	0.06	0.24
Panel Test a	0.04	0.02	0.02	0.14	0.00	0.04
Cointegration Support	Yes	Yes	Yes	No	Yes	Yes

Note: Group tests, rejecting H0 suggests that there is cointegration between Oil & Gas Value the relevant institutional variable for at least one country.
Panel tests, rejecting HO suggests that the panel as a whole is cointegrated.
Critical values were bootstrapped to allow for cross-sectional dependence.
Source: Freedom House (2013), Geo-Help Inc. (2011), Heston et al. (2012), Ross and Mahdavi (2015), World Bank (1995; 2013).

Appendix Table A-8 List of Countries and Group Composition

Mature Producers	LAC	MENA	ROW	Less-Exp. Producers	LAC	MENA	ROW
Albania			X	Bangladesh			X
Algeria		X		Belgium			X
Angola			X	Benin			X
Argentina	X			Bulgaria			X
Australia			X	Cameroon			X
Austria			X	Chad			X
Bahrain		X		Chile	X		
Bolivia	X			China			X
Brazil	X			Cote d'Ivoire			X
Canada			X	Denmark			X
Colombia	X			Ecuador	X		
Congo, Rep.			X	Equatorial Guinea			X
Congo, Dem. Rep.			X	France			X
Cuba	X			Ghana			X
Egypt, Arab Rep.		X		Greece			X
Gabon			X	Guatemala	X		
Hungary			X	Ireland			X
India			X	Israel		X	
Indonesia			X	Jordan		X	
Iran, Islamic Rep.		X		Korea, Rep.			X
Italy			X	Mauritania			X
Japan			X	Mongolia			X
Kuwait		X		Morocco		X	
Libya		X		Mozambique			X
Malaysia			X	New Zealand			X
Mexico	X			Niger			X
Netherlands			X	Norway			X
Nigeria			X	Oman		X	
Peru	X			Pakistan			X
Poland			X	Papua New Guinea			X
Qatar		X		Philippines			X
Romania			X	Rwanda			X
Saudi Arabia		X		Senegal			X
Syrian Arab Republic		X		South Africa			X
Thailand			X	Spain			X
Trinidad and Tobago	X			Sudan		X	
Turkey		X		Sweden			X
United Arab Emirates		X		Switzerland			X
United Kingdom			X	Taiwan			X
United States			X	Tanzania			X
Venezuela, RB	X			Tunisia		X	
				Vietnam			X
				Yemen		X	
Total Mature	9	11	21	Total Non-Mature	3	7	33

Source: Author Calculations, Geo-Help Inc. (2011), Ross and Mahdavi (2015).

Appendix Table A-8 Continued List of Countries and Group Composition

Non-Producers	LAC	MENA	ROW
Bhutan			X
Botswana			X
Burkina Faso			X
Burundi			X
Central African Republic			X
Comoro Is.			X
Costa Rica	X		
Cyprus			X
Dominican Republic	X		
El Salvador	X		
Ethiopia			X
Fiji			X
Finland			X
Gambia, The			X
Guinea			X
Guinea-Bissau			X
Guyana	X		
Haiti	X		
Honduras	X		
Jamaica	X		
Kenya			X
Lao PDR			X
Lesotho			X
Liberia			X
Madagascar			X
Malawi			X
Mali			X
Mauritius			X
Nepal			X
Nicaragua	X		
Panama	X		
Paraguay	X		
Portugal			X
Sierra Leone			X
Singapore			X
Somalia			X
Sri Lanka			X
Swaziland			X
Togo			X
Uganda			X
Uruguay	X		
Zambia			X
Zimbabwe			X
Total Non-Producers	11	0	32

Totals	LAC	MENA	ROW
Mature	9	11	21
Less-Experience	3	7	33
Non-Producer	11	0	32
Total	23	18	86

Source: Author Calculations, Geo-Help Inc. (2011), Ross and Mahdavi (2015).

Appendix B Supplementary Material for Chapter 3

General Social Survey Sample Weights and Restrictions.—The following samples were dropped: the African American oversample in the 1982 and 1987 GSS; surveys that were conducted in Spanish (and could not have been completed in English); the 1972 and 1985 surveys (because the question preceding happiness changed); and observations from split-ballot experiments that were conducted in 1980, 1986, and 1987. The GSS weight WTSSALL was applied to ensure samples approximated the national population. This strategy was employed by Herbst and Ifcher (2014). [Paraphrased from Footnote 2 on page 5 of Herbst and Ifcher (2014)].

Appendix Table B-1 Population Shares by Demographic Group, General Social Survey

	1977		2014	
Group	Obs.	Pop. Share	Obs.	Pop. Share
Women	1530	53%	2446	54%
Black	1530	11%	2446	15%
Youth	1524	15%	2436	9%
Foreign-Born	1529	7%	2446	13%
Hispanic	na	na	2438	14%
High School and Less	1526	84%	2446	63%
Married	1530	69%	2443	52%
Parent	1517	74%	2440	71%

Source: Author calculations from NORC, General Social Survey (Release 2, April 17, 2015)

Appendix Table B-2 Summary Statistics for Key Micro Variables

	1977			2014		
Variable	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.
Happy (1-3 scale)	1528	2.25	0.64	2438	2.21	0.63
Age (yrs)	1524		16.86	2436	47.46	17.39
F-Educ. (yrs)	1092	9.05	4.18	1830	12.05	4.06
M-Educ. (yrs)	1249	9.58	3.66	2198	11.86	3.75
Income[a] (2000$s)	1372	25623	19968	2206	32559	27965

a. Income is measured as total family income per equivalent household size. Specifically: household income (GSS variable coninc) divided by equivalent household size (GSS household composition and OECD-modified equivalence scale, OECD 2015).
Source: Author calculations from NORC, General Social Survey (Release 2, April 17, 2015)

Appendix Table B-3 Self-Reported Income and Unemployment as a Percentage of Total Population, by Population Group, 2006 – 2012.

Panel A	Full Sample		Men		Women	
	Unempl.	Income	Unempl.	Income	Unempl.	Income
2006	3.3%	33776	3.6%	36475	3.1%	31370
2008	3.4%	33826	4.7%	36653	2.3%	31163
2010	7.3%	29501	10.0%	31471	5.1%	27798
2012	5.2%	32474	6.5%	35194	4.1%	30122
Abs. Change (2010-2006)	4.0%	-4275	6.4%	-5004	2.0%	-3572
Percent Change (10-06)	119.4%	-12.7%	179.9%	-13.7%	62.8%	-11.4%

Panel B	Black		nonBlack		Youth		nonYouth	
	Unempl.	Income	Unempl.	Income	Unempl.	Income	Unempl.	Income
2006	5.5%	24150	3.0%	35203	6.5%	23707	2.9%	34922
2008	8.2%	21495	2.7%	35799	6.5%	20927	3.0%	35430
2010	9.3%	21138	6.9%	30950	8.3%	17653	7.1%	30809
2012	8.6%	21244	4.6%	34487	8.3%	22297	4.8%	33740
Abs. Change (2010-2006)	3.8%	-3013	4.0%	-4253	1.8%	-6054	4.3%	-4113
Percent Change (10-06)	68.7%	-12.5%	133.1%	-12.1%	28.5%	-25.5%	148.9%	-11.8%

Panel C	Native		Foreign		Hispanic		nonHispanic	
	Unempl.	Income	Unempl.	Income	Unempl.	Income	Unempl.	Income
2006	3.5%	34086	1.3%	33146	6.5%	26862	3.0%	34467
2008	3.6%	33795	1.5%	34118	2.9%	25027	3.5%	34796
2010	7.4%	29981	6.5%	26196	10.5%	16385	6.8%	31378
2012	5.5%	32420	2.8%	33194	6.7%	25289	5.0%	33451
Abs. Change (2010-2006)	3.9%	-4105	5.2%	-6950	4.0%	-10477	3.8%	-3089
Percent Change (10-06)	110.9%	-12.0%	395.5%	-21.0%	62.4%	-39.0%	126.0%	-9.0%

Source: Author calculations from NORC, General Social Survey (Release 2, April 17, 2015)
Notes: Income is total real family income (from all sources) adjusted for household size. The unemployment population share is the unemployed share of the total population, not the labor force.

Appendix Table B-4 Key Macroeconomic Variables and Their Sources

Variable	Unit	Value		Aggregation	Source
		1977	2014		
Real GDP pc[a]	2000$s	24428	45873	By Census Division	Bureau of Economic Analysis: Regional Economic Accounts
Unemployment Rate	% of labor force	7.03	6.18	By Census Division	Bureau of Labor Statistics: Local Area Unemployment Statistics
Inflation Rate (CPI)	%	6.49	1.62	U.S. Aggregate	World Development Indicators
Social Expenditure[b]	% of GDP	12.80	18.70	U.S. Aggregate	OECD Social Expenditure Database (SOCX)
Median House Price	2000$s	127765	240226	By Census Region	U.S. Census Bureau New Residential Sales Historical Data: Sales Price by Houses Sold
Gini Coefficient[c]	na	0.36	0.45	U.S. Aggregate	U.S. Census Bureau, Current Population Survey, Annual Social and Economic Supplements. Table F-4. Gini Indexes for Families, by Race and Hispanic Origin of Householder: 1947 to 2013
Past Recession[d]	Dummy	0	0	U.S. Aggregate	NBER Recession Dating Committee

a. NAICs Current GDP per capita by state was extended back using SIC GDP per capita by state. GDP was then aggregated and adjusted for population by census division, and then inflation.
b. 1977 Social Expenditure value is for 1980. Data is available beginning in 1980.
c. 2014 Gini Coefficient is for 2013. 2014 is not yet available.
d. Coded: 1 for the years: 1974, 1975, 1980-1983, 1990, 1991, 2001, and 2002.
Source: Listed in table.

Appendix Table B-5 2010 Deviation from Long-Term Trend. Change in Probability of Reporting "Very Happy", Full Sample, 1973 – 2014

	(1)	(2)	(3)	(4)	(5)	(6)
Year 2010	-0.046***	-0.029***	-0.001	-0.044***	-0.001	-0.015
	[-12.245]	[-5.401]	[-0.320]	[-14.013]	[-0.323]	[-1.456]
Observations	32945	32945	30227	32945	30227	21191

Source: Author's calculations based on data reported in text.
Notes: Marginal effects correspond to λ_2 from the ordered probit regressions, detailed below. Column 1 replicates the base model (i.e. table 2, column 1). Column 2 includes the main effect for employment status and its interaction with 2008 and 2010 (excludes income). Column 3 includes the main effect for income and its interaction with 2008 and 2010 (excludes employment status). Column 4 uses a cubic trend, but no additional control variables. Column 5 uses the cubic trend with the main effect for income and interaction. Column 6 repeats column 3, but uses real personal income as opposed to adjusted family income.

All models include the control variables: woman, black, youth, age, age squared, ten-year birth-cohort, and mother's and father's education. The estimated regression (specified in OLS) is: $happy_{it} = \alpha_0 + \boldsymbol{\beta}'\boldsymbol{x}_{it} + \delta preces_t + \lambda_0 trend_t + \lambda_1 d_{08} + \lambda_2 d_{10} + \boldsymbol{\lambda_3}'\boldsymbol{c}_{it} d_{08} + \boldsymbol{\lambda_4}'\boldsymbol{c}_{it} d_{10} + \varepsilon_{it}$. $happy_{it}$ is reported happiness for individual i in year t; $\boldsymbol{x}_{it}$ is a vector of individual characteristics; $preces_t$ is a dummy variable for past recessions; $trend_t = year_t - 1972$ and d_t are dummy variables for the years 2008 and 2010. $\boldsymbol{c}_{it}$ is a vector of individual variables or channels that may explain the Great Recession. They are also included in $\boldsymbol{x}_{it}$.
t statistics in brackets (clustered by year); * p<.10 ** p<.05 *** p<.01.

Appendix Table B-6 Fixed-Effects Logit Regressions; GSS Panel 2006-2014; Dependent Variable "Very Happy", Main Effects by Year (Base = 2010).

	(1)	(2)	(3)	(4)
2006	0.357***	0.339***	0.433***	-0.779
	[2.995]	[2.826]	[2.588]	[-0.619]
2008	0.163*	0.144*	0.132	-0.096
	[1.907]	[1.685]	[1.068]	[-0.107]
2012	0.154*	0.144*	0.317***	0.656
	[1.883]	[1.758]	[2.764]	[0.763]
2014	0.397***	0.396***	0.544***	2.334**
	[3.429]	[3.394]	[3.276]	[2.284]
Employment & Income	no	yes	no	no
Employment by Year	no	no	yes	no
Income by Year	no	no	no	yes

Source: Author's calculations based on data reported in text.
Notes: Overlapping Panel – described in footnote 10. 1,195 individuals observed 3 times for a total of 3,585 observations. Column 2 adds controls for income (ln(Eqv. Inc.)) and employment status. Omitted category is full-time employed. Column 3 interacts employment status with year, but excludes income controls). Column 4 interacts income with year (excludes employment controls).
Reported year main effects correspond to $\boldsymbol{\lambda_\tau}$ in the following specification (in OLS form for simplicity): $Veryhappy_{it} = \alpha_i + \boldsymbol{\beta}'\boldsymbol{x}_{it} + \sum_{\tau=1}^{2}(\boldsymbol{\lambda_\tau} + \boldsymbol{\gamma}'_\tau\boldsymbol{x_{it}})d_\tau + \sum_{\tau=4}^{5}(\boldsymbol{\lambda_\tau} + \boldsymbol{\gamma}'_\tau\boldsymbol{x_{it}})d_\tau + \varepsilon_{it}$. $Veryhappy_{it}$ takes the value of 1 if individual i reports being "very happy" in year t; $\boldsymbol{x}_{it}$ is a vector of individual characteristics. d_τ are dummy variables for each period (2006 = 1; 2008 = 2; … 2014=5).
t statistics in brackets (clustered by individual); * p<.10 ** p<.05 *** p<.01.

Appendix C Supplementary Material for Chapter 4

C.1 Sample Attrition

The Chapter 4 regression estimates are consistent even in the presence of attrition. This conclusion is based on the results from a test discussed below.

Background and Theory:—In general, sample attrition is a concern when exploiting the panel dimension of a data set. If people who leave the panel have different characteristics (e.g. more likely to become unemployed), then attrition is considered selective, and the relationship between happiness and unemployment could be biased. This problem could be an issue in the GSOEP, less than 50 percent of the original 1984 sample remains after 2007 (Kroh 2011). However, that does not mean attrition is selective.[45] To test for selection bias caused by attrition, I used a test suggested by Wooldridge (2010).

Wooldridge (2010) shows that sample selection (e.g. from attrition) is only a problem in a fixed-effects context when selection is related to the idosyncratic errors. More precisely, in reference to Equation C-1 ($U_{it} = \boldsymbol{\gamma'} \boldsymbol{X_{it}} + \eta_i + \nu_{it}$), let selection be represented by the indicator s_{it}, where $s_{it} = 1$ if $(\boldsymbol{X_{it}}, U_{it})$ is observed. For selection to not be a problem, ν_{it} needs to be mean independent of s_{it}, given $(\boldsymbol{X_i}, \eta_i)$ for all possible t. If this condition is met, fixed-effects estimation "on the unbalanced panel is consistent and asymptotically normal. (Wooldridge 2010, 830)."

Although the "assumption [above] may be a reasonable approximation, especially for short panels (Wooldridge 2010, 830)," there is a simple test. Add s_{it+1} to Equation C-1, estimate

[45] Sample selection due to attrition in the GSOEP data is not generally a concern. For example, the 2008 *Economic Journal* and 2014 *Economica* papers, which also uses GSOEP data, do not address attrition (Clark et al. 2008; Gielen and van Ours 2014).

the new equation using fixed effects on the unbalanced panel, and do a t test for the significance of s_{it+1}. Under the null hypotheses, v_{it} is uncorrelated with s_{it} for all periods, and so selection in the future period should not be significant in the equation at time t. This test is similar to what was originally suggested by Nijman and Verbeek (1992), and the description is paraphrased from Wooldridge (2010, 832).

Results:—The results presented in Appendix Table C-1 suggest selection is not a problem in the GSOEP context. The above condition appears to be met – being present in the sample one period ahead, "Lead Selection" (s_{it+1}), is not correlated with being unemployed, conditional on the covariates and fixed effects. Note that the test suggests sample selection is not a problem for the unbalanced panel, yet under a slightly stronger assumption, "it is also valid to use a standard fixed effects analyiss on any balanced subset of the unbalanced panel… (Wooldridge 2010, 831)." Given this result and the need for at least three periods (for fixed-effects and lagged variables), the main analysis uses an unbalanced panel including everyone that is observed for at least three consecutive periods.

Appendix Table C-1 Selective Attrition Fixed-Effects Regression. Germany 1996-2013 Unemployment Regressed on Lagged Determinants[a] and Future Selection

	(1)
Selection Lead	0.001
	(0.002)
Life Satisfaction	-0.005***
	(0.000)
ln(Eqv. Inc.)	-0.003
	(0.002)
Self Reported Health	-0.005***
	(0.001)
Constant	0.119***
	(0.044)
Observations	235026
Adj. R Sq.	0.014

a. Year by state, age, and month of interview not lagged.
Notes: Selection lead = 1 if the employment status and determinants are observed in period t+1. Additional controls include: (year by state, age, and month of interview, education, marital status, parent dummy, child less than 5, potential experience and its square.
Standard errors in parentheses (clustered by individual).
Significance: * $p<0.10$ ** $p<0.05$ *** $p<0.01$

C.2 German Socio-Economic Panel Variables

Ln(Eqv. Inc): The natural log of total family income, per equivalent household size. Family income is from all sources, before taxes, not conditional on employment, and adjusted for inflation, which is then divided by equivalent household size using the OECD-modified equivalence scale (OECD 2015).

Pot. Exp.: Potential Experience equals: age – years of education – five.

Tenure (yrs): "Length of time with Firm"

Unmpl. Hist: Total length of time a person has been unemployed (in years).

JobFind Difficult: If you were currently looking for a new job: Is it or would it be easy, difficult or almost impossible to find an appropriate position? Scaled (1 – 3) with almost impossible taking the value of three.

Job Satisfaction: How satisfied are you today with the following areas of your life? Job. Scaled (0-10).

Health Good: Would you say your own health, in general, is excellent, good, fair, or poor? Scaled (1-4) with excellent scored as a four.

Industry and Occupation Categories
1 Digit Industry Code, based on collapsing the GSOEP industry categorization into ten broad categories in order to match the variable used in the Cross-national Equivalent File (Ohio State University). The original GSOEP categorization is based on the Statistical Classification of Economic Activities in the European Community, commonly referred to as NACE.

2 Digit Occupation Code, based on the International Labour Organization's International Standard Classification of Occupations, version ISCO-88.

Death of Partner: Has your family situation changed after [year end of previous calendar year]? Spouse/partner has died. Coded 1 if yes.

Note dummies were created for missing values associated with income, health, marital status, and job satisfaction/expectations. If income was missing for example, then Ln(Eqv. Inc) would be set to zero and Inc. Missing would equal one.

Personality Traits

Optimism When you think about the future, are you – optimistic, more optimistic than pessimistic, more pessimistic than optimisitc, or pessimistic? (scored 1- 4 with 4 representing optimistic).

Questions are answered on 7-point Likert-type scales (1 – "disagree completely" to 7 – "agree completely"), and then averaged within a construct to obtain a single construct score. Variable definitions are from (Heineck and Anger 2010).

Big-Five Traits	**I see myself as someone who…**
Openness	is original, comes up with new ideas
to experience	values artistic experiences
	has an active imagination
Conscientiousness	does a thorough job
	does things effectively and efficiently
	tends to be lazy (reversed)
Extraversion	is communicative, talkative
	is outgoing, sociable
	is reserved (reversed)
Agreeableness	is sometimes somewhat rude to others (reversed)

	has a forgiving nature is considerate and kind to others
Neuroticism	worries a lot gets nervous easily is relaxed, handles stress well (reversed)

Additional Traits

Locus of Control (External)	1. Compared to other people, I have not achieved what I deserve. 2. What a person achieves in life is above all a question of fate or luck. 3. I frequently have the experience that other people have a controlling influence over my life. 4. The opportunities that I have in life are determined by the social conditions. 5. Inborn abilities are more important than any efforts one can make. 6. I have little control over the things that happen in my life.
Reciprocity (Positive)	1. If someone does me a favor, I am prepared to return it. 2. I go out of my way to help somebody who has been kind to me before. 3. I am ready to undergo personal costs to help somebody who helped me before.
Reciprocity (Negative)	1. If I suffer a serious wrong, I will take revenge as soon as possible, no matter what the cost. 2. If somebody puts me in a difficult position, I will do the same to him/her. 3. If somebody offends me, I will offend him/her back.

Cogntive Ability (description repeated from SOEPpapers: Anger and Schnitzlein, 2016)

Symbol Corespondence Test
Coded as the correct number of entries in 90 seconds. (GSOEP Var: f99z90r).
Description: "The symbol correspondence test is conceptually related to the mechanics of cognition or fluid intelligence and encompasses general abilities. It was developed after the symbol digit modalities test (Smith, 1995) and involves asking respondents within 90 seconds to assign with a keyboard as many correct numbers as possible to symbols, which are consecutively displayed on a screen, while the correspondence list is permanently visible to them (Anger and Schnitzlein 2016, 8)."

Word Fluency Test
Coded as the total number of animals mentioned in 90 seconds (GSOEP Var: f96t90g).
Description: "The word fluency test is conceptually related to the pragmatics of cognition or crystallized intelligence. This test involves the fulfillment of specific tasks that improve in accordance with previously acquired knowledge and skills. The word fluency test implemented in the SOEP is based on the animal-naming task (Lindenberger and Baltes, 1995): respondents

name as many different animals as possible within 90 seconds. Whereas verbal fluency is based on learning, speed of cognition is related to an individual's innate abilities (Cattell, 1987) (Anger and Schnitzlein 2016, 9)."