ABSTRACT

This empirical study seeks to identify key determinants of the recent post-Great settlement pattern of undocumented immigrants inside the U.S. Among the potential determining factors considered are the degree of labor market freedom, the quality of life, and Sanctuary cities. The focus is the year 2012, which has not by itself as yet been studied for this purpose. The estimation results provided in this study imply that the state-level settlement pattern of undocumented immigrants in the U.S. was an increasing function of labor market freedom, the number of Sanctuary cities, and the overall quality-of-life index, as well as per capita personal income, while being a decreasing function of the cost of living and colder climate. Furthermore, the impacts of labor market freedom and the other variables in the model are affirmed using a modest robustness test involving a semi-log estimate for the 2014 settlement pattern of undocumented immigrants.

Keywords: Settlement Pattern of Undocumented Immigrants, Settlement Pattern at the End of 2012, Labor Market Freedom, Quality of Life, Economic Factors, 2014 Robustness Test

JEL Classifications: J49, J61, P12, P19

RIASSUNTO

Gli effetti della libertà nel mercato del lavoro ed altri fattori sul modello di gestione degli immigrati irregolari per gli anni 2012 e 2014

Questo studio empirico tenta di identificare le determinanti chiave del recente modello post-grande accordo per gli immigrati irregolari all’interno degli Stati Uniti. Tra i fattori potentemente determinanti presi in considerazione ci sono il grado di libertà del mercato del lavoro, la qualità della vita, e le città rifugio. L’anno preso in considerazione è il 2012, dato che...
non è ancora stato studiato. I risultati delle stime ottenute implicano che il modello di sistemazione a livello statale degli immigrati irregolari negli USA è una funzione crescente del livello di libertà nel mercato del lavoro, del numero delle città rifugio e dell’indice di qualità della vita, così come del reddito procapite, mentre risulta essere funzione decrescente del costo della vita e del clima più freddo. Inoltre, l’impatto della libertà del mercato del lavoro e di altre variabili nel modello sono confermate utilizzando un test a robustezza modesta che considera una stima semi-log per il modello dell’anno 2014 per gli immigrati irregolari.

1. INTRODUCTION

Various studies have investigated the effects of economic freedom and certain institutional frameworks (such as regulatory quality, political corruption, and political stability) on economic growth. Most of these empirical studies find that there exists a strong, positive impact of economic freedom, as well as measures of good governance, including good quality regulation, lower levels of corruption, and greater political stability on economic growth rates (Belasen and Hafer, 2013; Bennett and Vedder, 2013; Cebula and Mixon, 2014; Cebula et al., 2013a; Clark and Lawson, 2008; Dawson, 1998, 2003; Gwartney et al., 2006; Hall, 2013; Hall et al., 2010; Heckelman and Stroup, 2000; Islam, 1996; Nissan and Niroonmand, 2008). This impact of findings is predicated presumably upon the argument that increased economic freedom elevates the growth/pace of economic activity through incentives to work, invest, save, hire/dismiss, make market-based business decisions, and take risk in a market-based economy.

Associated with this attention to real GDP growth is the implicit objective of increasing or maximizing well-being. Arguably, were it not for this underlying objective, the findings of these studies might well be of relatively little genuine interest and significance. In recent years, there has been an expressed increased awareness of and acknowledgement of the importance of this goal of increasing “human happiness” as defined by well-being and the level of economic freedom (overall) or the level of any of its major components, such as labor freedom, as well as the degree of regulatory quality, the degree of good governance, the absence of corruption, the magnitude of tax burdens and redistributive/equity traits of tax systems, and the degree of personal freedom. Indeed, studies expressly linking greater well-being to higher levels of economic freedom have been published by several authors (Hagerty and Veenhoven, 2003; Gropper et al., 2011; and Belasen and Hafer, 2013).
This study seeks to provide further insights into the linkage between the settlement patterns of undocumented immigrants in the U.S. and labor market freedom, the quality of life (whose components, as measured in this study, are partly quality-of-life in the more “traditional sense,” and partly institutional in nature), and the presence of sanctuary cities (which well-being by providing increased personal freedom/protection). This study adopts a well-being maximization model to explore the impact of institutional (and other) factors on undocumented immigrant settlement patterns. In pursuit this goal, we adopt available state-level data for the U.S. (Belasen and Hafer, 2013; Cebula et al., 2013a; Cebula et al., 2013b; Cebula et al., 2014; and Nair-Reichert and Cebula, 2015), with the focus being on the settlement patterns of undocumented immigrants in 2012.

2. RELATED LITERATURE

In recent years, undocumented immigration in the U.S. has been the subject matter of scholarly research that addresses diverse topics\(^1\). For example, Nair-Reichert and Cebula (2015) and Kaushal (2008) have studied the effects of granting in-state tuition to undocumented immigrants wishing to attend public colleges and universities. Alternatively, Cebula and Koch (2008) investigate the impact of undocumented immigration on identity theft (ID theft) in the U.S., finding strong empirical evidence that identity theft is an increasing function of the extent of undocumented immigration.

From yet a different perspective, Hanson (2006) investigates reasons underlying the increased flow of undocumented immigrants from Mexico to the U.S. He finds that there are three specific contributors to this phenomenon: (1) an increase in the size of the working-age population as a percentage of the total population in Mexico; (2) greater volatility in U.S.-Mexico relative wages; and (3) changes in U.S. immigration policies. In the case of the latter, Hanson (2006) notes that although U.S. law requires authorities to prevent illegal immigration and take punitive measures against firms employing undocumented immigrants, there has often been relatively lax enforcement of these laws, a view shared by the Congressional Research Service (2006).

\(^1\) The Pew Research Center (2013, p. 2) refers to an “unauthorized migrant” as a “... person who resides in the U.S. but is not a U.S. citizen, has not been admitted for permanent residence, and is not in a set of specific authorized temporary statuses permitting longer-term residence and work.”
Finally, four recent studies, Cebula et al. (2013b), Cebula et al. (2014), Nair-Reichert and Cebula (2015), and Cebula (2015) have focused on identifying factors influencing the settlement pattern of undocumented immigrants in the U.S. Cebula et al. (2013b) and Cebula (2015) find that warm climate, higher median family income and higher overall economic freedom (as opposed to labor market freedom) all act to attract this population cohort. Meanwhile, Cebula et al. (2014) find that illegal immigrants, while attracted to warmer climates and higher median income levels, have an aversion to settling in states where the unionization rate is higher, arguably because joining a union might increase detection of their illegal presence in the U.S. and ultimately elevate deportation risks. Finally, Nair-Reichert and Cebula (2015) study the impact of educational access to higher public education on the location decisions of undocumented migrants in the U.S. Nair-Reichert and Cebula (2015) find that undocumented migrants locate in states with higher median income and large pre-existing clusters of other undocumented migrants. However, the effect of financially easier educational access to higher public education is found to have very little impact on the settlement pattern of this group.

3. EXPLANATORY VARIABLES: LABOR FREEDOM, QUALITY OF LIFE, AND SANCTUARY

In pursuit of the objective of this study, a focus on labor market freedom is undertaken. There are several well-known measures (indices) of either overall economic freedom or the various forms of economic freedom, including those by Gwartney et al. (2012), the Heritage Foundation (2013), and Stansel et al. (2014). This study adopts the overall labor market freedom index by state for the U.S. generated for the year 2011 by Stansel et al. (2014, Table 3.10c, p. 43), which conforms to the state-level data-based analysis provided in this study. This overall labor market freedom index consists of three “component indices.” For simplicity and in the interest of space constraints, only brief, simple descriptions of these component indices are provided here; the reader is referred to Stansel et al. (2014, Chapter 3) for a more detailed description and explanation of these dimensions of labor market freedom in the U.S.

The first component of the overall labor market freedom index involves the state minimum wage established at the sub-national level. The idea in this case is that minimum wage legislation requiring higher wages than market forces would dictate limits to the ability of low-skilled and new entrants into the workforce to negotiate for employment they might otherwise be willing to accept and hence restricts the economic freedom of these workers, as well as the employers who
might otherwise have hired them. The second component of the labor market freedom index involves government employment and takes the perspective that economic freedom decreases for several reasons as government employment increases, beyond what is needed for governmental productive and protective functions. Government is regarded as effectively expropriating funds to take an amount of labor out of the labor force, restricting the ability of individuals and organizations to contract freely for labor services, since employers seeking to hire in effect have to bid against their own tax dollars in order to obtain labor services. Finally, the third labor market freedom component index deals with “union density”. It is predicated on the notion that workers should have the right to form and join unions or not to do so, as they choose. It is observed that certain statutes and regulations governing the labor market often force workers to join a union, even if they prefer not to do so (the “union shop”), permit unionization efforts where coercion can potentially be employed, especially where there exist undemocratic provisions such as union certification without a vote by secret ballot, and may make decertification of a union difficult even if a majority of workers would prefer decertification. Each of these component indices has a value computed that can be as low as 0.0 and as high as 10.0, with a higher index value implying greater labor market freedom. The present study measures labor market freedom as the equally-weighted average value across these three component indices. Hence, it is hypothesized here that the higher the labor market freedom index in a state, the more attractive the state is as a place of better prospective employment and hence as a place of residence (settlement) for undocumented immigrants, who are in pursuit of greater well-being in their lives, ceteris paribus. Thus, the impact of labor market freedom is a basic component of the overall objective being investigated in this study.

Another variable included in this study is an index of the overall quality of life by state, QUALINDEX\textsubscript{j}, provided for 2011 at Bankrate.com (2013). This index, which rates each of its dimensions from highest to lowest, is known by the label “Best and Worst States to Retire”; for the interested reader, this index has been critiqued in Cebula (2014) and found to be robust as compared with other similar indices. In this study, the index ranks all 50 states according to such quality of life considerations as the following: their respective hospital beds per 1,000 population; their respective doctors per 100,000 population\textsuperscript{2}; their respective average state plus local income, sales, and property taxes per capita; their respective violent crime rates and

\textsuperscript{2} Regarding well-being and health care quality and geographic mobility, see Saltz (1998).
property crime rates per 100,000 population; their respective weather attributes, namely, average summertime temperatures, average humidity, and average percent sunshine; and surveys of peoples’ assessment of their personal well-being in each state (“community well-being”). Accordingly, in this study, the highest overall rated state (Wyoming) receives a score of 50, whereas the lowest overall rated state (Arkansas) receives a score of 13. It is hypothesized in the present study that undocumented immigrants seeking to maximize their well-being would prefer settling in a state with a higher quality of life index over one with a lower quality-of-life index, ceteris paribus. Observe the presence in this index of such diverse factors as the state plus local tax burden and measures of health care quality and select measures of climate, along with the presence of crime and weather dimensions in the index, all of which can be regarded as utility-influencing factors.

In addition to the factors noted above, people very likely seek to maximize their well-being in other ways. For instance, they may seek also to maximize personal freedom. Arguments regarding the importance of personal as well as economic freedom to well-being can be traced back not only to the founding fathers of the U.S. Republic (Ellis, 2000) but also, albeit in more technical terms, to indexes of both economic freedom and personal freedom (e.g., Ruger and Sorens, 2009). Indeed, a recent study of U.S. domestic migration of U.S. residents and citizens has found both overall economic freedom on the one hand and overall personal plus economic freedom to have exercised positive impacts on net state in-migration over the 2000-2010 period (Cebula, 2014).

It is hypothesized, for the case of undocumented immigrants in the U.S., that personal freedom is perceived by this population cohort as being increased by the existence of sanctuary cities. “Sanctuary cities” are those that enact statutes not requiring public officials, especially police, to report suspected undocumented immigrants to federal officials. This form of sanctuary pragmatically acts to afford greater personal freedom for undocumented immigrants because they can experience a potentially significant degree of protection from being detained, incarcerated, processed, and potentially then deported (Congressional Research Service, 2006; OJJPAC, 2013). Hence, the greater the number of sanctuary cities in a state, the greater the perceived benefits (well-being) from residence/settlement in that state since doing so increases

QUALINDEXj was reconstructed using “min-max” normalization so that higher values for this index are associated with a higher ranking in terms of the overall quality of life.
well-being for those receiving the sanctuary. In other words, the greater the number of sanctuary cities in a state \((SANCTUARY_j)\), the more attractive that state is for settlement (residence) for undocumented immigrants (Cebula, 2015), \textit{ceteris paribus}.

There are of course other likely determinants of undocumented immigrants. These would \textit{not} reasonably be categorized as directly related to labor market freedom \((LABMKTFREE)\), the \textit{QUALINDEX} as described above, or \textit{SANCTUARY}_j. These \textit{additional} variables are described in the model developed below and reflect to some limited extent certain variables considered in prior studies such as Cebula \textit{et al.} (2013), Cebula \textit{et al.} (2014), and Nair-Reichert and Cebula (2015). Unlike the latter of these studies, the present study uniquely adopts a well-being maximization model and focuses upon very recent immigration settlement pattern estimates, namely, those for the year 2012 (Pew Research Center, 2013).

4. Framework and Data: 2012

The undocumented migrant is treated as viewing the decision to migrate to the U.S. ultimately as a well-being-maximizing endeavor. Once the decision to migrate to the U.S. is made, the geographic settlement pattern of undocumented immigrants within this destination country reflects a decision-making process intended to increase, and ideally, to seek to maximize well-being. In other words, undocumented immigrants settle in those states that are expected to best meet their economic and non-economic needs and thereby to maximize their well-being.

For the representative undocumented immigrant, individual \(i\), the settlement pattern decision is treated in this study as a benefit-cost analysis intended to maximize \(i\)'s well-being:

\[
\text{MAX: } EWB_{ij} = f(EGB_{ij}, EGC_{ij})
\]

where \(EWB_{ij}\) = representative individual \(i\)'s expected net well-being from settling in (residing in or migrating to) state \(j\); \(EGB_{ij}\) = representative individual \(i\)'s expected gross benefits/well-being associated with settling in (residing in or migrating to) state \(j\); and \(EGC_{ij}\) = representative individual \(i\)'s expected gross costs/reduced well-being associated with settling (residing in or migrating to) state \(j\). Following the conventional wisdom, it is expected that:

\[
f_{EGB_{ij}} > 0; f_{EGC_{ij}} < 0
\]

Following in principle prior models of domestic U.S. migration such as those in Vedder \textit{et al.} (1986), Saltz (1998), and Cebula and Alexander (2006), among others, the factors that influence
EGBi\textsubscript{j} and EGCi\textsubscript{j} consists in this study of three broad sets of institutional and non-institutional considerations. These sets of variables are, as follows:

1. Economic conditions (broadly defined) in the states, including those impounded in this study, in the variable for labor market freedom, $LABMKTFREE_i$;
2. Quality-of-life conditions in the states, including those embedded in this study in $QUALINDEX_i$ and $SANCTUARY_i$; and
3. Public policies in the states, including those embedded in the variables $LABMKTFREE_i$, $QUALINDEX_i$, and $SANCTUARY_i$.

The dependent variable, $SETTLE_i$, indicates the percentage of the population in state $j$ that is estimated to consist of undocumented immigrants in 2012. Expressing the latter as a percent of the state's total population permits comparisons of the undocumented immigrant settlement pattern across state lines. In effect, this variable can be regarded largely as a de facto cumulative net in-migration rate of undocumented immigrants. The value of $SETTLE_i$ is positive for all states. The estimate of the total undocumented immigrant population residing in the U.S. is estimated at 11.2 million for the study year, 2012, the data for which were estimated with rigorous methodologies according to the Pew Research Center (2013).

In order to measure economic conditions/prospects in state $j$ for the estimations provided in this study, four factors are adopted in the initial model: $PCPERSINC_i$, nominal per capita personal income in state $j$ (for the year 2012), which is included as a measure of current income/wage prospects in state $j$; $COST_j$, the overall cost of living in state $j$ for the average four-person family in the year 2011, expressed as an index having a value greater than 0, with $COST_j = 100.00$ being the mean; $UR_j$, the average percentage unemployment rate in state $j$ in 2010; and the variable $LABMKTFREE_i$, the index of labor market freedom in state $j$ in 2011, as described above. In the next section of this study, the 2012 value of labor market freedom will be considered.

The choice of an income variable such as $PCPERSINC_i$ as a reflection of potential earnings opportunities is standard in empirical population studies (Vedder, 1976; Vedder et al., 1986; Mixon, 1993; Saltz, 1998; Cebula and Alexander, 2006). Higher levels of this variable can be regarded by undocumented immigrants as offering better economic prospects and thus as
elevating gross expected well-being, $EGBij$ (Conway and Houtenville, 1998; Cebula and Alexander, 2006; Cebula et al., 2013b). The adoption of a variable such as $COSTj$ has become increasingly common in migration studies of the U.S. in recent years (Conway and Houtenville, 1998; Cebula and Alexander, 2006; Cebula, 2014), with a higher level of this variable being associated by undocumented immigrants with a lower living standard and hence higher expected gross costs/reduced gross well-being, $EGCij$. The unemployment rate variable, $URj$, is used in the first estimate as a measure of employment prospects. Theoretically, the higher the unemployment rate in state $j$, the more difficult it would likely to be for undocumented immigrants to secure a job and hence the lower their expected gross well-being, $EGBj$. Finally, the inclusion in this study of labor market freedom per se, $LABMKTFREEj$, is the foundation for investigating one of the fundamental hypotheses considered in this study; interestingly, its presence parallels in principle the use of a measure of overall economic freedom as a determinant of net U.S. domestic internal migration for the 2000–2010 period recently undertaken by Cebula (2014). In any case, a higher level for this variable is hypothesized as elevating gross expected well-being for undocumented immigrants, $EGBij$. Alternatively stated, $SETTLEj$ is hypothesized to be an increasing function of $LABMKTFREEj$, ceteris paribus.

To measure quality of life conditions per se for undocumented immigrants in state $j$, the focus in this study is on two factors. First, there is the overall quality-of-life index/variable $QUALINDEXj$, adopted in this study as a measure of a combination of factors that may influence the expected quality of life for undocumented immigrants and thus as influencing gross expected well-being, with higher values of $QUALINDEXj$ be associated with greater expected gross well-being, $EGBj$. Second, there is the variable $HDDj$, the average annual number of heating degree days in state $j$, as a measure of cold climatic conditions, a variable/factor not included expressly in the $QUALINDEXj$ variable, but one that theoretically can be viewed by undocumented migrants as affecting their expectations of gross reduced well-being, i.e., as increasing expected gross costs, $EGCij$; in effect, $HDDj$ can be viewed as supplementing $QUALINDEXj$. As in many prior studies of population settlement patterns in the U.S., the variable $HDDj$, or some reasonable substitute for $HDDj$ such as average January temperatures, is considered as a potentially important influence on settlement patterns. In the case of $HDDj$, given the established finding of an aversion on the part of most people to cold weather and all that cold weather implies, e.g., snow, ice storms, blizzards, hazardous driving conditions, and so
forth (Saltz, 1998; Conway and Houtenville, 1998), a higher value for HDD\textsubscript{j} can be regarded by undocumented immigrants as elevating expected gross costs or reducing well-being in state \textit{j}, EGC\textsubscript{ij}, \textit{ceteris paribus}. On the other hand, the higher the value of the multi-faceted QUALINDEX\textsubscript{j} variable, the greater the value that undocumented immigrants assign to the gross expected well-being, EGB\textsubscript{ij}.

Next, the variables LABMKTFREE\textsubscript{ij}, QUALINDEX\textsubscript{j}, and SANCTUARY\textsubscript{j} all reflect to at least some degree state and local government policies in state \textit{j}. Based upon the propositions put forth in Section 3 of this study, it is hypothesized that, for undocumented immigrants to the U.S., the expected gross benefits/increased well-being in state \textit{j}, i.e., EGB\textsubscript{ij}, is an increasing function of each of these three public-policy (or at least partially public-policy) variables, \textit{ceteris paribus}.

Thus, the model following is hypothesized:

\begin{equation}
EGB_{ij} = g(\text{PCPERSINC}_j, \text{LABMKTFREE}_j, \text{QUALINDEX}_j, \text{SANCTUARY}_j, \text{UR}_j) \tag{3}
\end{equation}

where

\begin{equation}
g_{\text{PCPERSINC}} > 0, g_{\text{LABMKTFREE}} > 0, g_{\text{QUALINDEX}} > 0, g_{\text{SANCTUARY}} > 0, g_{\text{UR}} < 0 \tag{4}
\end{equation}

and

\begin{equation}
EGC_{ij} = h(\text{COST}_j, \text{HDD}_j) \tag{5}
\end{equation}

where

\begin{equation}
h_{\text{COST}} > 0, h_{\text{HDD}} > 0 \tag{6}
\end{equation}

Substituting equations (3), (4), (5), and (6) into equation (1) yields:

\begin{equation}
EWB_{ij} = k(\text{PCPERSINC}_j, \text{LABMKTFREE}_j, \text{QUALINDEX}_j, \text{SANCTUARY}_j, \text{UR}_j, \text{COST}_j, \text{HDD}_j) \tag{7}
\end{equation}

where

\begin{equation}
k_{\text{PCPERSINC}} > 0, k_{\text{LABMKTFREE}} > 0, k_{\text{QUALINDEX}} > 0, k_{\text{SANCTUARY}} > 0, k_{\text{UR}} < 0, k_{\text{COST}} < 0, k_{\text{HDD}} < 0 \tag{8}
\end{equation}

Based on the model outlined in (7) and (8), the following equation is to be estimated initially:

\begin{equation}
(\text{SETTLE}_j) = a_0 + a_1 \text{PCPERSINC}_j + a_2 \text{LABMKTFREE}_j + a_3 \text{QUALINDEX}_j + a_4 \text{SANCTUARY}_j + a_5 \text{UR}_j + a_6 \text{COST}_j + a_7 \text{HDD}_j + u \tag{9}
\end{equation}

Equation (9) represents the basic model expressed in linear form.

Full definitions and data sources for the variables in the analysis are provided in Table 1 for the year 2012. The expected signs on the coefficients in equation (9) are, as follows:

\begin{equation}
a_1 > 0, a_2 > 0, a_3 > 0, a_4 > 0, a_5 < 0, a < 0, a_7 < 0 \tag{10}
\end{equation}
For the interested reader, descriptive statistics for each of the variables in the analysis are provided in Table 2.

5. FINDINGS FOR 2012

The results from estimating equation (9) by OLS, using the White (1980) heteroskedasticity correction, are provided in Table 3, where the terms shown in parentheses are $t$-values. In Table 3, the coefficients on six of the seven of the explanatory variables exhibit the hypothesized signs, with all six being statistically significant at the 5% level; only the unemployment rate variable, $UR_j$, fails to be statistically significant at the 5% level with the expected sign. Finally, the $F$-statistic is statistically significant at the 1% level, attesting to the overall strength of the model.

The results shown in Table 3 imply that, at the 5% statistical significance level, the undocumented population in a state, expressed as a percentage of the population of that state (hereafter, the relative size of the undocumented immigrant population in a state), is an increasing function of the state’s per capita personal income ($PCPERSINC_j$). It is also shown that the relative size of the undocumented immigrant population in a state is, at the 2% statistical significance level, an increasing function of the overall quality of life measure for the state ($QUALINDEX_j$). Next, it is shown that, at the 3% statistical significance level, the relative size of the undocumented immigrant population in a state is an increasing function of the degree of labor market freedom in the state ($LABMKTFREE_j$), which includes a number of institutional dimensions. In addition, the estimation results imply that, at nearly the 3% statistical significance level, the relative size of the undocumented immigrant population in a state is an increasing function of the number of Sanctuary cities in the state ($SANCTUARY_j$). Furthermore, the findings in Table 3 reveal that at the 5% statistical significance level the relative size of the undocumented immigrant population in a state is a decreasing function of the overall cost of living in the state ($COST_j$). Finally, the estimate implies that, at the 4% statistical significance level, the relative size of the undocumented immigrant population in a state is also a decreasing function of the average annual number of heating degree days (as a measure of cold weather) in the state ($HDD$).

Thus, at least on a preliminary basis, one can infer that the estimation results provided in Table 3 imply that, potentially, given an acknowledgement of the limitations of OLS estimation, states
with higher levels of *per capita* personal income, greater labor market freedom, more Sanctuary cities, and a higher quality of life (as reflected in the QUALINDEX\textsubscript{j} variable) act to elevate the well-being of undocumented immigrants settled in the U.S. Furthermore, states that have colder winter weather (as reflected by the variable HDD\textsubscript{j}) are potentially associated with lower levels of well-being for this population cohort. Finally, states with lower levels of the overall cost of living appear to be associated with higher levels of well-being for this population cohort. For the interested reader, the correlation matrix among the explanatory variables is provided in Table 4. As shown, there are no multi-collinearity issues.

6. **Findings for 2014**

As a modest test of the robustness of the findings for 2012, an additional estimate of the model (modified somewhat) using preliminary estimates for the year 2014 of the settlement pattern of undocumented immigrants, SETTLE\textsubscript{j} 2014, by state (Pew Research Center, 2016) is provided in Table 5. This variant of the initial specification is expressed in semi-log form and deletes the statistically insignificant unemployment rate. As shown, with the sole exception of the Sanctuary cities variable (SANCTUARY\textsubscript{j}), the findings qualitatively affirm all of the results summarized in Table 3.

7. **Conclusion**

The estimation results provided in this study imply that the state-level settlement pattern of undocumented immigrants in the U.S. was an increasing function of labor market freedom, the number of Sanctuary cities, and the overall quality-of-life index, as well as *per capita* personal income, while being a decreasing function of the cost of living and colder climate. In addition, within the context of a well-being maximization model, the results in this study theoretically imply that the well-being of the undocumented immigrant population residing in the U.S. was positively affected by greater labor market freedom (and the institutional components thereof), by a greater number of Sanctuary cities (and the greater personal freedom afforded by non-reporting of suspected undocumented immigrants), by a higher level of the quality-of-life (as reflected by the QUALINDEX\textsubscript{j} variable and its various institutional as well as non-institutional components), by a higher level of *per capita* personal income, PCPERSINC\textsubscript{j}, by a lower level of the overall cost of living, COST\textsubscript{j}, and by a lower number of heating degree days, HDD\textsubscript{j}.
Although the purpose of this study is to identify factors that likely influenced the pattern of illegal migrant settlement among the 50 states, two of the variables involved do consist significantly of public policy dimension that arguably warrant mention. First of all, an important component of the quality-of-life index is the average level of state plus local income, sales, and property taxes per capita. Implicitly, the settlement pattern of undocumented immigrants in the U.S. reflects an aversion to higher levels of such taxation; consequently, those states with lower levels of such taxes can be predictably more attractive to this population cohort and, hence, more susceptible to the financial and accompanying infrastructure strains and challenges that may result from the influx of these relatively poor and relatively uneducated immigrants. One plausible result, Ironically, of this phenomenon may be a rise in taxes in lower-tax states in order to cope financially. Moreover, the results in this preliminary study also find that Sanctuary cities appear to accomplish exactly what they are intended, namely, to attract an influx of undocumented immigrants. However, this influx implies that the financial and infrastructure strain eventually resulting therefrom will potentially compromise the quality of local government infrastructure and finances and also therefore create, over time, pressure to elevate local revenues to accommodate the new population influx. On the other hand, for all intents and purposes, to the extent that undocumented immigrants cannot avoid paying local sales taxes as well as state sales taxes and to the extent that local property taxes are imputed into rent, their presence implies that somewhat greater levels of local as well as state revenue increases occur. Also, to the extent that at least some Sanctuary cities require undocumented immigrants to become legal residents in order to qualify for certain services, including job training (such as painting skills), learning English and basic math as well as being provided formal job-market access that guarantees they will be paid for services/work rendered, at least to some degree the cohort in question can end up contributing to state (and, in a modest number of cases) local government coffers through the payment of income taxes.
REFERENCES


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### Table 1 - Variables and Data Sources

<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition and Data Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>SETTLE\textsubscript{j}</td>
<td>the undocumented migrant population in state (j) as a percent of the state population, 2012; Pew Research Center (2013)</td>
</tr>
<tr>
<td>PCPERSINC\textsubscript{j}</td>
<td>per capita personal income in state (j), 2011; Bureau of Business &amp; Economic Research, University of New Mexico (2013)</td>
</tr>
<tr>
<td>LABMKTFREE\textsubscript{j}</td>
<td>index of economic freedom in state (j) in 2011; Stansel \textit{et al.} (2014, pp. 42-43)</td>
</tr>
<tr>
<td>QUALINDEX\textsubscript{j}</td>
<td>an index of the overall quality of life by state, 2011; Bankrate.com (2013)</td>
</tr>
<tr>
<td>SANCTUARY\textsubscript{j}</td>
<td>the number of “sanctuary cities” in state (j), 2011; Congressional Research Service (2006) and OJJPAC (2013)</td>
</tr>
<tr>
<td>COST\textsubscript{j}</td>
<td>cost of living for the average 4-person family in state (j), 2011; Council for Community and Economic Research (2013)</td>
</tr>
<tr>
<td>HDD\textsubscript{j}</td>
<td>average annual heating degree days in state (j) in 2011; U.S. Census Bureau (2012, Table 396)</td>
</tr>
<tr>
<td>UR\textsubscript{j}</td>
<td>the average percentage unemployment rate of the civilian labor force in state (j), 2011; U.S. Bureau of Labor Statistics (2016)</td>
</tr>
</tbody>
</table>

### Table 2 - Descriptive Statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>SETTLE\textsubscript{j}</td>
<td>2.526</td>
<td>1.735</td>
</tr>
<tr>
<td>PCPERSINC\textsubscript{j}</td>
<td>41,828</td>
<td>6,135</td>
</tr>
<tr>
<td>LABMKTFREE\textsubscript{j}</td>
<td>6.66</td>
<td>0.542</td>
</tr>
<tr>
<td>QOLINDEX\textsubscript{j}</td>
<td>25.72</td>
<td>14.878</td>
</tr>
<tr>
<td>SANCTUARY\textsubscript{j}</td>
<td>2.98</td>
<td>5.08</td>
</tr>
<tr>
<td>COST\textsubscript{j}</td>
<td>100.00</td>
<td>15.97</td>
</tr>
<tr>
<td>HDD\textsubscript{j}</td>
<td>5,010.98</td>
<td>2,207.16</td>
</tr>
<tr>
<td>UR\textsubscript{j}</td>
<td>8.762</td>
<td>2.113</td>
</tr>
<tr>
<td>SETTLE\textsubscript{j} (2014)</td>
<td>2.520</td>
<td>1.667</td>
</tr>
</tbody>
</table>
### Table 3 - OLS Estimation Results, White (1980) Correction Adopted, 2012

Dependent Variable: \((\text{SETTLE}_j)\)

<table>
<thead>
<tr>
<th>Explanatory Variables</th>
<th>Coefficient</th>
<th>(t)-value</th>
<th>(p)-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>(PCPERSINC_j)</td>
<td>0.00009*</td>
<td>2.08</td>
<td>0.0439</td>
</tr>
<tr>
<td>(LABMKTFREE_j)</td>
<td>0.829**</td>
<td>2.29</td>
<td>0.0272</td>
</tr>
<tr>
<td>(QOLINDEX_j)</td>
<td>0.0297</td>
<td>2.43</td>
<td>0.0192</td>
</tr>
<tr>
<td>(SANCTUARY_j)</td>
<td>0.091**</td>
<td>2.32</td>
<td>0.0254</td>
</tr>
<tr>
<td>(COST_j)</td>
<td>-0.025**</td>
<td>-2.03</td>
<td>0.0490</td>
</tr>
<tr>
<td>(HDD_j)</td>
<td>-0.0002***</td>
<td>-2.13</td>
<td>0.0390</td>
</tr>
<tr>
<td>(UR_j)</td>
<td>0.347*</td>
<td>1.80</td>
<td>0.0793</td>
</tr>
<tr>
<td>Constant</td>
<td>-6.82*</td>
<td>-1.73</td>
<td>0.0905</td>
</tr>
</tbody>
</table>

\(F\)-Statistic: 10.41*** \(p\)-value: 0.000000

\(R^2\): 0.63

\(Adj. R^2\): 0.57

Terms in parentheses are \(t\)-values. ***statistically significant at the 1% level; **statistically significant at the 5% level; *statistically significant at the 10% level.

### Table 4 - Correlation Matrix

<table>
<thead>
<tr>
<th></th>
<th>(PCPERSINC)</th>
<th>(COST)</th>
<th>(LABMKTFREE)</th>
<th>(HDD)</th>
<th>(SANCTUARY)</th>
<th>(QOLINDEX)</th>
<th>(UR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(PCPERSINC)</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(COST)</td>
<td>0.457</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(LABMKTFREE)</td>
<td>0.331</td>
<td>-0.002</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(HDD)</td>
<td>0.368</td>
<td>0.301</td>
<td>-0.095</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(SANCTUARY)</td>
<td>0.252</td>
<td>0.453</td>
<td>-0.148</td>
<td>-0.228</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(QOLINDEX)</td>
<td>0.303</td>
<td>0.453</td>
<td>-0.148</td>
<td>0.143</td>
<td>0.318</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>(UR)</td>
<td>-0.328</td>
<td>-0.074</td>
<td>-0.213</td>
<td>-0.339</td>
<td>0.276</td>
<td>0.193</td>
<td>1.000</td>
</tr>
</tbody>
</table>
### TABLE 5 - OLS Estimation Results, White (1980) Correction Adopted, 2014

Dependent Variable: $\log(SETTLE_{j \ 2014})$

<table>
<thead>
<tr>
<th>Explanatory Variables</th>
<th>Coefficient</th>
<th>$t$-value</th>
<th>$p$-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>$PCPERSINC_{j}$</td>
<td>0.00007***</td>
<td>3.21</td>
<td>0.0025</td>
</tr>
<tr>
<td>$LABMKTFREE_{j}$</td>
<td>0.348**</td>
<td>2.27</td>
<td>0.0280</td>
</tr>
<tr>
<td>$QOLINDEX_{j}$</td>
<td>0.0338***</td>
<td>5.10</td>
<td>0.0000</td>
</tr>
<tr>
<td>$SANCTUARY_{j}$</td>
<td>0.023</td>
<td>1.57</td>
<td>0.1237</td>
</tr>
<tr>
<td>$COST_{j}$</td>
<td>-0.022***</td>
<td>-3.32</td>
<td>0.0018</td>
</tr>
<tr>
<td>$HDD_{j}$</td>
<td>-0.00027***</td>
<td>-6.77</td>
<td>0.0000</td>
</tr>
<tr>
<td>Constant</td>
<td>-1.62*</td>
<td>-1.62</td>
<td>0.1117</td>
</tr>
<tr>
<td>$F$-Statistic</td>
<td>11.64***</td>
<td></td>
<td>0.000000</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.62</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adj. $R^2$</td>
<td>0.57</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Terms in parentheses are $t$-values. ***statistically significant at the 1% level; **statistically significant at the 5% level; *statistically significant at the 10% level.