Potential Economic Impacts in Oregon of Implementing Proposed Department of Homeland Security "No Match" Immigration Rules

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Executive Summary

This study evaluates the impact of implementing a strict "No Match" immigration rule on Oregon's economy. The analysis assumes that such a policy would lead to the departure of Oregon's estimated 150,000 undocumented immigrants, of which 97,500 are estimated to be part of Oregon's workforce. The main findings of the study are as follows:

1. In the immediate or short run, the loss of undocumented workers in Oregon which represent 4.3% of the workforce is estimated to cause a decline in employment of 7.7%, or a loss of 173,500 jobs (76,000 beyond the jobs vacated by undocumented workers). Net income or "value-added" would be reduced nearly 6% as would total output; proprietor's income would drop by 8.5%.

2. In the long run when prices, markets and investment decisions have had time to adjust, these impacts would be moderated somewhat. But employment is still estimated to decline between 4.1% and 6.5%; Total value-added would drop between 4.8% and 3.3%.

3. The departure of Oregon's undocumented workers is not likely to have a significant effect on Oregon's unemployment rate. First, most unemployment is "frictional" or transitional meaning that it is part of an ongoing, regular turnover process in the labor market. Every three months over 100,000 jobs are created in Oregon; implementation of the "No Match" policy would eliminate a slightly lower number. Thus, the large majority of unemployment is due to the transition process as workers move from jobs that have been eliminated to jobs that are being created. Second, there is a mismatch in skills, education and location between undocumented workers and Oregon's unemployed, making it extremely difficult to expect Oregon's unemployed to fill positions vacated by undocumented workers.

4. The departure of undocumented immigrants from Oregon is estimated to lower state and local tax revenues by between $400 million and $656 million per year. These estimates are larger than figures from other studies for Oregon and for other states because it takes account of the dynamic effects that the departure of undocumented workers would have on the rest of the economy, not just on undocumented workers' own tax contributions. Whether spending on undocumented immigrants by Oregon's governments is higher or lower than their tax contributions is unclear. Two out of five studies from other states find spending exceeds revenues; two find the reverse, and one concludes they are about equal.

5. The impacts from implementing the proposed "No Match Rule" are likely to be far greater in some specific labor markets and for some industries than is suggested by these economy-wide estimates. In labor markets where undocumented workers are highly concentrated, the resulting labor shortages, reduced output and upward pressure on wages (and costs) would be significantly larger.

I. Introduction

The impact, role and contribution of undocumented immigrants in the U.S. economy has been a major topic of debate for several decades. The recent introduction and promotion of competing national policy proposals on immigration has been accompanied by a heightened debate that is both contentious and emotional. Frequently, the claims advanced in the context of this debate have not been well supported by either data or analysis. One policy proposal under consideration, referred to as the "No Match rule," would require employers to verify the legal status of workers. It is believed that implementation of this proposal would effectively eliminate from the workforce all workers who do not have the required valid documentation for employment.

This No Match Rule policy would have a significant impact on the workforce in many specific sectors of the economy, with significant spillover effects throughout the whole economy. The likely impact of this policy on the economy of Oregon has not been evaluated previously in detail, which means that debate surrounding its consequences has not been well grounded quantitatively. The analysis in this report is intended to fill this void.

The purpose of this report is to provide an estimate of the overall economic impacts that would result from the elimination of undocumented workers from the Oregon economy. Using detailed data, empirical economic studies, and a regional input-output model, the report attempts to answer the following questions: What changes would likely result in terms of economic output, employment, wages and income? What are the likely effects on public revenues of these changes? How are these changes likely to be distributed across sectors and time horizons (short-run versus long-run)?

A sharp decline in the availability of labor can have large impacts on an economy. The net effect of the various economic adjustments that would occur is complex and difficult to ascertain without detailed study. There can be short run as well as long run consequences. The magnitude of these effects will depend on a number of factors, and will differ by industry, sector and location. The loss of an immigrant workforce will negatively affect the supply of labor, but it will also affect the demand for goods and services since immigrants are consumers as well as

producers. The fiscal effects of undocumented workers, or their departure, will depend on both their propensity to pay taxes and the direct and indirect dynamic ways that their departure would alter labor markets and economic activity. Finally, a concern is frequently raised that undocumented workers are occupying jobs that could be filled by the unemployed, the implication being that the removal of undocumented workers would lead to a reduction in the unemployment rate.

In the case of Oregon's economy, the economic effects of the loss of undocumented immigrants would depend on the existing role of these workers and their contribution to the economy, as well as the responses and adjustments that would take place following their withdrawal. Thus we need to evaluate both their current role and the likely responses and adjustments if that role were eliminated.

This report is organized as follows. Section II presents a review of the economic issues and relevant economics literature. Section III describes the methods and models that are used. The results of the analysis are presented mainly in Section IV. Section V addresses the ways in which undocumented workers affect government revenues and public spending (including results from the model for Oregon). In Section VI the unemployment rate, and the potential substitution of the native unemployed workers for undocumented workers is discussed. Section VII summarizes the results.

II. The Economic Issues and Literature

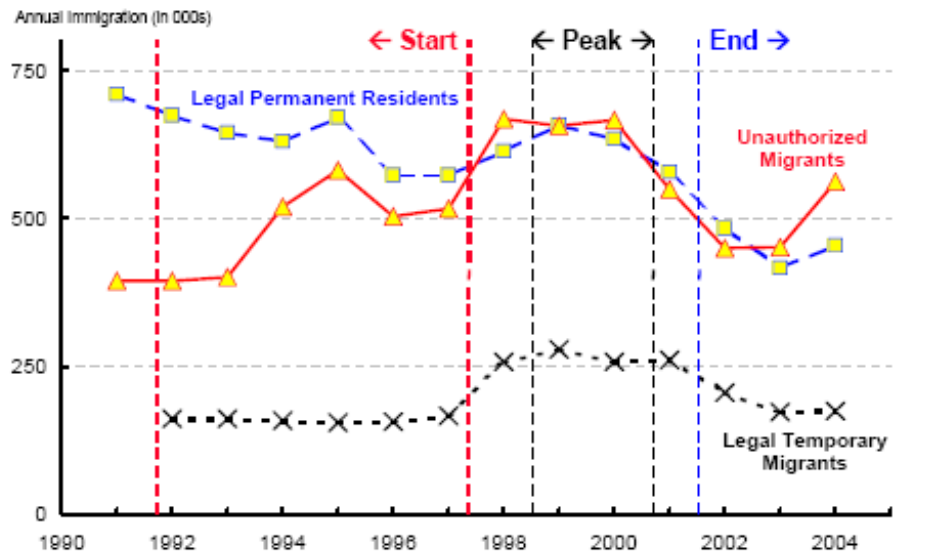
Immigrants (both undocumented and authorized) contribute to economic growth: they are responsible for a significant portion of the growth in aggregate supply and demand in the overall economy. The numbers of authorized immigrants has declined somewhat since the early 1990s whereas the number of undocumented immigrants has risen, beginning in the mid-1990s (see Figure 1).

The main economic issues related to immigrants' contributions to (or drain on) the economy typically involve one or more of the following: a) their effect on wages in the labor market, b) their effect on economic output and income, c) their effect on costs and

competitiveness, and d) their effects on the public sector, including tax revenues and public expenditures and services.

Additional issues include the role and contribution of immigrant labor in a fluctuating economy (e.g., potential stabilizing role), their effects on income distribution and poverty among native workers, and the differences between their immediate or short-run impacts and their long-run impacts and "generational outcomes."

Figure 1. Annual Immigration to the United States by Legal Status



Source: Pew Hispanic Center, 2005.

Much national attention is paid to the economic effects of immigration policy. The greatest interest appears to be on the potential adverse effect of recent immigrants or undocumented immigrants on labor market outcomes of native-born and authorized workers. The main concern here is that immigrants may compete with authorized workers in the labor market, displacing them and/or bidding down wages. The prospect of reversing an immigrant flow that has already occurred by expelling undocumented workers raises the possibility that the negative effects on authorized workers will also be reversed. Indeed, in 2004 Senator Lamar Alexander asked FED Chairman Alan Greenspan "If we have 8.4 million unemployed, according to our official statistics, and if 6 million illegal immigrants are working, are these 6 million taking the jobs that 8.4 million want? (Campbell, 2006 p. 20). While generally speaking, the answer to Senator

Alexander's question is no (for reasons discussed in detail below), his question reflects widespread misperceptions about the likely impacts of eliminating undocumented workers.

A. Immigrants and labor markets

The responses and adjustments of an economy to the loss of an immigrant population will depend on how the supply and demand for labor adjusts toward a new equilibrium in the markets where undocumented immigrants worked, as well as in other labor markets. Economic studies of labor markets comprise a large literature. Several studies have documented the significant economic contribution and impact of immigrant populations on regional economies. One such study of North Carolina found that the growing Hispanic population contributes more than $9 billion to the state's economy due to their productivity, spending and tax payments (Kasada and Johnson 2006). An Iowa study estimated that undocumented immigrants contribute $40 to $62 million in state taxes annually (Johannsen 2002). Studies of this kind attempt to measure the role or contribution of immigrants to the economy in its current condition. It would be misleading, however, to suggest that these findings represent estimates of the dynamic changes that would occur if a significant fraction of the immigrant population were to leave.

To answer dynamic questions about increases or decreases in immigrant labor generally, and undocumented immigrants in particular, we need to look at the dynamics of labor markets over time and cases where immigrant populations have risen or declined so that evidence of the effects can be identified statistically. Indeed, many studies have attempted this kind of analysis, examining the relationship between changes in the number of immigrant (documented and/or undocumented) workers, wages for immigrant and native workers (where "native" is used in this literature to refer to all authorized workers), and changes in job opportunities and labor supply for native workers and recent versus non-recent immigrants. Over the past decade a number of studies have applied advanced statistical techniques to large datasets in order to detect the dynamics of immigrant labor, wages, native labor supply, capital utilization, etc. Recent work on this topic differs to some degree from the results of earlier economics research. I will discuss here some of the most authoritative among the recent studies addressing this topic.

In one study, Greenwood, Hunt and Kohli (1996) employ a production theory approach to examine cross-sectional census data from 1980 in 123 metropolitan areas in the U.S. They find that in the short-run, when wages are inflexible, an increase in immigration causes

employment of native workers to fall, but quantitatively the effect is found to be small. In this short-run analysis, they also find that owners of capital are made better off because both the rental price of capital and profits rise. In the long run, when factor prices have had an opportunity to adjust, they find that the economy returns to "full employment" and that the wages of native workers have fallen only slightly.

Indeed, the consensus among economists in the mid-1990s was that the effect of immigration on labor market outcomes of natives was small. There was no statistically significant evidence that immigrants caused reductions in native employment; and the literature at that time suggested that a 10 percent increase in the fraction of immigrants in the population reduced native wages by at most 1 percent. These general conclusions come from a survey of the existing literature as of 1995 (Friedberg and Hunt 1995).

However, more recent analysis by Borjas and others now appears to represent something of a consensus view. Looking more specifically at cases where native workers have skill levels similar to immigrant workers, and in large cities where workers are more mobile and where immigrant flows are concentrated, David Card (2001) finds evidence that immigrant inflows over the 1980s reduced wages and employment rates of low-skilled natives in traditional "gateway" cities like Miami and Los Angeles by 1-3 percentage points. Card concludes that in these circumstances, and when looking closely at specific skill categories, that "immigrant inflows exert a powerful short-run effect on the relative supplies of different types of labor in different cities"(p. 48). Card further concludes that the "conclusion that immigrant inflows affect native employment rates is new. However, the implied effects for natives as a whole are very small. Even for workers in the bottom of the skill distribution, I find relatively modest employment effects of recent immigrant inflows in all but a few high-immigrant cities … The results in this article suggest that these massive expansions may have significantly reduced employment rates for younger and less-educated natives in these cities" (p. 58). In the current context, we are interested in these results because a reversal of immigrant flows would also be expected to reverse the estimated effects of an increase in immigrant labor.

Most studies have taken a more general approach to labor market effects on authorized immigrants and undocumented immigrants (rather than a focus on major cities and workers in skill groups that compete most directly with immigrants). Among these studies, the work by George Borjas is one of the most authoritative and persuasive. In several studies conducted over

the past 20 years, Borjas's summary of his own work and other studies in the literature finds that an increase in immigrant labor of 10% can be expected to reduce wages overall by 3 – 4 %. This "inverse elasticity" suggests that removing undocumented workers from a labor market can be expected to have a similar upward effect on wages overall. For the increase in immigration between 1980 and 2000 (an increase in the labor force of about 11%), Borjas concludes that this immigration reduced average annual earnings of native-born men by an estimated $1,700 or roughly 4%. He adds that these earnings reductions occur regardless of whether the immigrants are legal or illegal, permanent or temporary. [1]

In addition to the effect of immigrant workers on labor market wages, these wage changes can be expected to affect labor supply. According to economic theory, with a lower wage the aggregate supply of labor should decline. Indeed, Borjas's estimates suggest that a 10% increase in immigrants will lower wages by 4.5%, and weeks worked by 3.5%. The labor supply elasticity implied by these two figures is 0.78 (e.g., a 10% decline in the wage will lead to a 7.8 % decline in weeks worked).[2]

B. Immigration and Taxes and Spending

One important component of the economic contributions of undocumented immigrants is their fiscal effects, which include tax payments and demands on public services. A number of studies have looked at the fiscal effects of undocumented immigrants in various parts of the U.S. (Strayhorn 2006; Kasada and Johnson 2006; Pearson and Sheehan 2007; Oregon Center for Public Policy 2007; and Mehta et al., 2002). Summary estimates from five studies are presented in Table 1.

It is widely recognized that undocumented workers pay taxes both directly and indirectly, but that they do not always benefit from those contributions in the same ways that native workers do. For example, undocumented workers often pay Social Security and Medicare taxes, and

[1] This literature also provides strong evidence that labor market adjustments are much larger for those skill levels which compete most directly with undocumented workers. Although Borjas's overall estimate of the wage elasticity in one paper (2004) is 0.37, when estimated across education levels he finds the effect to be three times as high for high school dropouts as in markets for workers with "some college."

[2] A study by Ottaviano and Peri (2007) has received considerable attention because they claim to show a positive effect of immigrant workers on wages. Their analysis, however, has been reexamined by Borjas, Grogger and Hanson (2008). They demonstrate persuasively that the Ottaviano and Peri results are very sensitive to the way they define and include specific categories of workers. In particular, high school students are included by Ottaviano and Peri and classified as dropouts. If these high school juniors and seniors are excluded from the data, the Ottaviano and Peri result disappears.

contribute to unemployment insurance, but they are unlikely to benefit from those programs unless they become legal U.S. residents.

A number of reports or studies document the contribution of undocumented immigrants to the public sector. A subset of those studies has attempted to quantify the cost of public services provided to undocumented workers (see Congressional Budget Office (2007) for a summary of recent studies). Some studies have concluded that the fiscal costs exceed the fiscal benefits of undocumented immigrants. For example, a study from Colorado estimates the costs for undocumented immigrants to be between $217 and $225 million for education, Medicaid and corrections, whereas taxes collected from these immigrants is estimated to be $159 million to $194 million annually. Similarly an Iowa study (Johannsen 2007) estimates tax revenues from an estimated 70,000 undocumented immigrants to be between $45.5 million and $70.9 million, while total services provided to them is estimated at $107.4 million.

Studies from other states such as Missouri and Texas have reached the opposite conclusion – that revenues exceed spending for undocumented immigrants (see Table 1). The Texas study (Strayhorn 2006) found that revenues exceeded services provided for undocumented workers by 36%, and in a Missouri study state revenues were estimated to exceed the costs of state-funded services by at least two-thirds, or between $11.5 million and $24 million annually (Ehresman 2006).

In the Texas study the revenue figures amount to $1,050 per undocumented immigrant; and in the Iowa study the revenues collected amount to between $570 and $860 per undocumented immigrant; when federal tax revenues are included, these per immigrant figures rise to between $1,285 and $2,000.

There are many difficulties in making these kinds of calculations accurately. For example, the Congressional Budget Office (2007) points out that many studies overlook the long run impacts of undocumented immigrants over a lifetime, as contributions to and demands from government services such as education or health care will vary across age groups (for example, undocumented workers are unlikely to collect social security when old).

Table 1. Fiscal Contributions of Undocumented Immigrants

State	Tax revenues collected		State spending
	Total ($ millions)	Dollars per immigrant	Total ($ millions)
Colorado	159 - 194	--	217 - 225
Iowa	45 - 71	650 - 1013	107
Missouri	29 - 57	580 - 1140	18 - 33
New Mexico*	69	1104	67
Oregon*	277	1848	--
Texas*	1,581	1,054	1,160

* Includes indirect taxes (e.g., sales taxes, employer contributions), etc.

It would require an in-depth analysis to compute the costs of public services for undocumented immigrants in Oregon or other states, and this is beyond the scope of the current analysis. Specific data on the use of education, health care, law enforcement and other public services would need to be evaluated individually for state, federal and local government providers. Moreover, for some public services the marginal cost of providing the service can be lower, or higher, than the average cost (e.g., the marginal cost of police or fire protection may be negligible for one additional resident).

On the revenue side of the equation, however, estimates can be made in several ways. One recent study for Oregon by the Oregon Center for Public Policy (OCPP) provides a very useful indication of the contribution of undocumented workers in terms of tax revenues (OCPP 2007). They estimate that undocumented immigrants contribute between $134 million and $187 million in taxes annually, plus another $97 million to $136 million that is contributed by employers on behalf of undocumented workers. On a per-immigrant basis, the OCPP estimates total tax revenues of about $1848 for each of the estimated 150,000 undocumented immigrants in Oregon (see Tables 2). Indeed, these figures are similar to those from other states.

Table 2. Tax Contributions of Undocumented Workers in Oregon

	Low estimate	High estimate
Undocumented population (number)	125,000	175,000
Total annual income*	1,800	2,500
Income per individual	14,400	14,400
Estimated taxes paid directly*	134	187
Per capita	1,072	1,069
As percent of income	7.4%	7.4%
State income taxes*	65	90
As percent of income	3.6%	3.6%
Social security taxes*	56	79
As percent of income	3.11%	3.16%
Medicare taxes*	13	18
As percent of income	0.7%	0.7%
Employer taxes paid on behalf of undocumented workers		
Unemployment insurance tax*	28	39
As percent of income	1.6%	1.6%
Social security tax*	56	79
As percent of income	3.1%	3.2%
Medicare taxes*	13.0	18.0
As percent of income	0.7%	0.7%
Total of directly and employer paid taxes*	231	323
Per undocumented immigrant	1,848	1,846

* In millions of US dollars.
Source: Oregon Center for Public Policy (2007)

III. Methodology and Modeling

The approach for the current analysis combines several sources of data, draws on the existing economics literature, and employs one primary modeling tool. The model employed is a regional input-output model (I-O model) of Oregon, or IMPLAN model produced and updated by MIG, Inc. Regional I-O models are intended to evaluate short-run impacts of changes in a regional economy. Thus, for our purposes, the Oregon IMPLAN model, if properly calibrated, can be used to estimate the immediate, short-run impacts of a loss of undocumented workers. The I-O model, however, represents an economy that is in full employment and where market prices are fixed. As a result, it does not allow for market adjustments such as changes in wages or prices, and the responses to those changes in wages or other factor prices. It does, however, capture the interconnections of the regional economy resulting from the buying and selling of commodities among industries in the region (indirect effects), and the impact that changes in income or profits have on consumer spending in the region (induced effects).

The I-O model can be modified to reflect some of the kinds of adjustments that would take place in the long run (when factor market prices adjust, capital can be purchased or sold, etc.), if there is an independent basis on which to estimate the magnitude of the long-run changes that are most important for our analysis. For the kind of reduction in the labor force that the loss of undocumented workers would represent, wages in the labor market would tend to rise, and the native or authorized workforce would respond to that wage increase by increasing labor supply. One may also anticipate that as wages rise, there will be some movement toward substituting capital for labor to the extent that is possible given existing technology. These responses are consistent with standard economic theory and the magnitudes of the effects have been documented in the empirical studies summarized above.

Since the magnitude of these responses has been documented in the recent economics literature, they can be applied directly to the Oregon model, applying the estimated elasticities to the percentage reductions in labor supply represented by the loss of Oregon's undocumented workers. The specific estimates and changes in wages and labor supply are discussed below, following a more detailed discussion of the data and the model.

Once the labor market adjustments (changes in wages paid to employees as well as labor supply) are calibrated and introduced as changes in the Oregon I-O model, the modified version of the I-O model can be used to evaluate the long run impacts. The impacts of these modifications then provide a more realistic estimate of how the loss of undocumented workers will affect economic output, employment, employee compensation, profits and value-added. The model also allows for an evaluation of the impacts of these changes on tax revenue. Although other studies have estimated the contribution of undocumented workers to tax revenues, as will be explained in more detail below, these estimates do not take account of the dynamic effects of the departure of undocumented workers. Thus these estimates of undocumented worker *contributions* to tax revenue represent an inherently different concept than one that measures the changes in tax revenues that would result from the *departure* of these immigrants.

A. Input-output modeling

IMPLAN (IMpact analysis for PLANning) is a kind of regional economy model originally developed by the USDA Forest Service in cooperation with the Federal Emergency Management Agency and the USDI Bureau of Land Management to assist the Forest Service in land and resource management planning. The IMPLAN accounts closely follow the accounting conventions used in the Input-Output (I-O) Study of the U.S. Economy by the Bureau of Economic Analysis (1980) and the rectangular format recommended by the United Nations. These models have become widely used by government agencies, planners, and economists, and are available commercially from MIG, Inc.

I-O models of this kind are used to estimate changes in employment and income caused by economic events that produce changes in outputs or final demands. The I-O model represents the interdependencies among production and consumption sectors in the regional economy, as well as the linkages to the economy outside the region. Changes in one sector in the region will give rise to changes in other sectors, resulting in "multiplier effects." There are two types of multiplier effects. "Indirect effects" occur when a change in one industry gives rise to changes in their purchases from other industries in the region. These indirect effects continue until leakages (purchases from outside the region) stop the cycle. The second type of multiplier effect, the "induced effect," is caused by changes in household spending in the region. Both of these effects

will be larger when the proportion of spending and purchases within the region is higher, so that there is less "leakage" of economic activity due to spending outside the state.

The current IMPLAN model for Oregon has been constructed using data from numerous sources, including the US Census Bureau, Bureau of Economic Analysis and the Bureau of Labor Statistics. The Oregon model has been calibrated to represent the demographic and economic structure of Oregon as of 2006. It implicitly includes the current contributions of undocumented immigrants.

B. Data

Primary data sources available for the current study include the US Citizenship and Immigration Service Bureau, US Census data and Current Population Surveys (CPSs), the Pew Hispanic Center, Oregon Office of Economic Analysis, and the Oregon Labor Market Information System. Oregon economy data for input-output and social accounting was obtained as part of the IMPLAN model (obtained from Minnesota IMPLAN Group, Inc.).

The first step of the analysis involves identifying those workers and households in the IMPLAN model that could be considered as representing undocumented immigrants. Although there are no detailed data on undocumented workers due to their "undocumented" status, estimates have been made by the Pew Hispanic Center (Passel 2006) and the U.S. Immigration and Naturalization Service (2003). With these sources, as well as a study of undocumented workers in Oregon by the Oregon Center for Public Policy (2007), the number of undocumented immigrants in Oregon is estimated at between 125,000 and 175,000. The composition of this population by gender, age, income and family size differs from that of the native and legal immigrant populations. Based on Passel (2007), we estimate the number of undocumented immigrants per family to be 1.67, and the labor force participation to be 65% (65 workers for every 100 immigrants). Nationally, Passel estimates 49% of undocumented immigrants to be men, 35% women and 16% children.

The average income per undocumented immigrant is lower than that of the native/legal population. Per capita income for undocumented workers is estimated nationally to be $14,000 to $15,000 compared to $38,000 for the authorized population (Passel). This difference, however, overstates the difference in earnings per worker because undocumented workers have a lower labor force participation rate than authorized individuals based on data and estimates from

Passel, OCPP and U.S. Immigration and Naturalization Service (2003). Given the rate of 0.65 workers per undocumented individual (compared to .84 for the population as a whole), the average income per undocumented worker (not per immigrant) is estimated to be $23,370 for Oregon. Based on these estimates, we will use an estimate of 150,000 undocumented immigrants in Oregon, of which 97,500 are workers earning an average of $23,370 per year.[3] These numbers of undocumented workers represent 4.3% of the total employment in Oregon.

Both Oregon's Employment Department and the Oregon IMPLAN model provide information on employment by industry and sector. However, the data from these two sources are broken down by different subcategories. Moreover, reliable data on the distribution of undocumented workers by industry, sector or region for Oregon are not available. As a result, the basis on which we might characterize the specific distribution of undocumented workers in the model is quite limited. In addition, the Oregon Employment Department only tracks "covered employment," which are employees eligible for unemployment insurance.

We do, however, have several pieces of information that make it possible to characterize the role of undocumented workers in the economy in a manner that is reasonable. First, there are national estimates of the share of undocumented workers in several sectors. Passel (2006) has estimated that undocumented workers make up 24% of workers in farming, 17% in cleaning, 14% in construction and 12% in food preparation. In addition, we know that for Oregon the 97,500 undocumented workers earn on average $23,370 per year.

C. Model Calibration

In order to use this economic model to replicate the kinds of adjustments that would occur if undocumented workers departed we need to a) characterize the current role and contributions of undocumented workers in the existing Oregon economy and b) evaluate the economic adjustments that would occur following their departure. These adjustments represent the short run (no changes in prices and thus no market responses) and the long run (markets adjust to new equilibria).

We utilize all of this information to calibrate our Oregon model in the following way. First, we assume that in farming, cleaning, construction and food preparation approximately the

[3] When the proportion of undocumented immigrants who are workers is taken account of, this income figure corresponds closely with the estimated $14,000 to $15,000 of income per undocumented immigrant.

same proportion of workers is undocumented in Oregon as has been estimated nationally. Second, we order the remaining industries from lowest to highest in terms of earnings per worker. If we assume that a fixed percentage of workers in these industries are undocumented (e.g., 2% or 4%), then we can adjust the number of industries included and/or the fraction of the workers that we assume to be undocumented, until we have a number of workers that corresponds to the desired total number of undocumented workers (97,500).

If the average earnings per worker for this group is lower than the target level ($23,370), we can increase the number of industries included (and correspondingly lower the fraction of workers assumed to be undocumented in each), until we achieve both the desired number of workers represented in the group as well as the desired average level of earnings.

Indeed, the desired approximate result was attained by assuming that, in addition to the four concentrated sectors of farming, cleaning, construction and food preparation (actually these four categories cover 76 specific industries in the input-output model), 101 other occupations were each assumed to include 2.15% of undocumented workers.[4]

D. Baseline Model of Oregon

A general description of the Oregon I-O model is provided in Table 3. Given the available data on undocumented immigrants, the model indicates that they represent 4.1 percent of the population and 4.3% of the workforce. Specific information on the distribution of the income of undocumented workers is not available. The income per capita of undocumented immigrants, estimated between $14,000 and $15,000 annually, is less than half of the $33,700 per capita for the economy of Oregon overall.

The I-O model is configured to represent the economy in the year 2006. This specification gives rise to annual industrial output totaling $292 billion, employee compensation of $86.5 billion, proprietor income of $10.5 billion, other property income of $41 billion, and indirect business taxes totaling $10.7 billion. [5] The combined value added of these latter four

[4] When the remaining occupations were ordered in terms of employee compensation per capita from lowest to highest, the percentage of workers assumed to be undocumented was varied until the desired number of total undocumented workers was included and also corresponded to the desired level of earnings per capita. This result was achieved at the 2.15% level across 101 occupations (aside from the four aggregated industry groups already included).

[5] Indirect business taxes include excise taxes, property taxes, fees, licenses, and sales taxes paid by businesses, but exclude taxes on profit or income. They are derived from U.S. Bureau of Economic Analysis Gross State Product.

categories sums to $148.8 billion. Employment is 2.26 million, or 84% of the population. Details of the baseline situation in each industry or industry group (all those representing at least 0.5% of Oregon's value-added) are presented in the Appendix.

Taking this economic model and configuration as representing the status quo or baseline model, we next describe the scenarios and impacts of removing undocumented workers from Oregon's workforce. This includes removing their purchasing power from the demand side of the economy.

Table 3. General Information about Oregon Input-Output Model

Household income level by category	Average household income ($)*	Number of households
Less than 5,000	7,937	126,515
5,000 - 10,000	19,843	95,162
10,000 - 15,000	31,749	196,126
15,000 - 20,000	47,623	203,176
20,000 - 30,000	67,466	258,738
30,000 - 40,000	111,120	295,513
40,000 - 50,000	142,869	142,235
50,000 - 70,000	198,429	95,959
More than 70,000	317,487	50,831
Totals:	124,589	1,464,255

Total population	3,700,758
Fraction of population undocumented	4.1%
Total personal income (million $)	124,589
Total households	1,464,255
Total employment	2,264,537
Fraction of employment undocumented	4.3%

* Average household income may exceed range due to underreporting of income to consumer expenditure surveys (30% upward revision)

IV. Impacts of a Loss of Undocumented Immigrants

This section presents results for short run and long run scenarios estimating the impacts on Oregon of the implementation of a nationwide No Match Rule. The implicit assumption for these results is that a No Match Rule would eliminate completely undocumented workers from the labor forces in Oregon and the nation as a whole. If a No Match Rule were to allow some proportion of undocumented immigrants to continue to work in Oregon and elsewhere, the results presented in the remainder of this report would need to be adjusted accordingly.

A. Short-run Impacts

The Oregon input-output model described above has been modified by aggregating certain industries into five categories that represent 177 industries in which undocumented workers participate. Following the estimates from Passel, the percentages of undocumented workers assumed to be employed in these industries are: farming (24%), cleaning (17%), construction (13%), food preparation (11%), and "other" (2.15%). We evaluate the short run impact of removing the undocumented workers from these five groups of industries by forcing these industry groups to operate without these undocumented workers. Given the design of input-output models, these labor reductions will produce proportional output reductions, reductions in demands for inputs from other industries, and reductions in value-added that is the source of income to workers and proprietors.

These short run impacts will not, however, reflect any of the moderating effects that would occur as a result of market adjustments to wages and labor supply. The short run scenario reflects a situation where there has not yet been time for labor market forces to adjust (rising wages, induced labor supply responses to those wage increases). This kind of model scenario does include, however, the effects of the reductions in labor utilization in industry employment, output, employee compensation, proprietor income, other property income, indirect business taxes and total value-added.

The estimated short run impacts are presented in Table 4. The loss of 4.3% of workers generates a reduction in statewide output of $17.7 billion, or 6.1%. Employee compensation is

reduced by $4.8 billion to $81.79 billion; a reduction of 5.5%. Indeed, the change in employment exceeds the 4.3% loss of undocumented workers. Owing to the indirect and induced effects of this economic shock, employment declines by 170,000 or 7.7%. Indicative of the contribution of the direct, indirect and induced components of these impacts is the composition of the value-added effects: direct (46%), indirect (25%) and induced (29%). The largest percentage decline in this short run analysis is for proprietor compensation, a reduction of 8.5%. Other property income, indirect business taxes and total value added all decline by more than 6%.

Table 4. Short Term Impacts of a Departure of Undocumented Workers from Oregon*

	Baseline model	Estimated change	Short-term impacts	Percent change
Population (millions)	3,700,758	-150,000	3,550,758	-4.1%
Employment (no. of jobs)	2,264,537	-173,537	2,091,000	-7.7%
Industry output	292,351	-17,689	274,661	-6.1%
Employee compensation	86,579	-4,788	81,791	-5.5%
Proprietor income	10,482	-892	9,589	-8.5%
Other property income	41,030	-2,446	38,584	-6.0%
Indirect business tax	10,729	-651	10,078	-6.1%
Total value added	148,819	-8,777	140,042	-5.9%

* Millions of dollars except where noted

It may also be useful to compare these changes on a per capita basis. Since the loss of undocumented workers is accompanied by a reduction in population of 150,000, the changes on a per capita basis are lower. Indeed, employee compensation per capita would actually increase with the departure of undocumented workers: because their average income is much lower than the average for the population as a whole, the average income in their absence would rise.

In addition to the five industry groups directly affected, significant reductions occur in over 200 other industries throughout the economy. Employment reductions are especially concentrated in wholesale trade, local government, health services and transportation.

B. Long Run Impacts

The relevance of these short run impacts may be fleeting. Indeed, to the extent that the departure of undocumented workers is anticipated, or if it occurs over a period of months or years, then labor markets are likely to begin adjusting: there will be upward pressures on wages due to realized or anticipated labor shortages, and as wages creep up additional labor supply will be forthcoming. Thus, the long run impact estimates may be more similar to the kinds of situations that will arise and be observable in the months or years following the departure of Oregon undocumented workers.

We can utilize the detailed economic structure of the input-output model while at the same time incorporating changes in market dynamics that we expect to occur in response to the removal of undocumented workers from the workforce. This is accomplished by modifying the model to reflect the labor market adjustments estimated in the empirical economics literature (as discussed above). Based primarily on the Borjas estimates (2003, 2004, 2008), a range of estimates is used here. First, for the "wage elasticity" (proportional response of market wage rate to changes in labor supply) we will use two estimates: a "low value" of 0.2 and a "high value" of 0.4. This range includes most of the variation in estimates found in the recent literature.[6] Given the resulting change in wage, the aggregate labor supply response of native workers must be adjusted. This aggregate supply elasticity is, in fact, implicit in the overall wage response estimate. Decomposing this from the literature, a value is used such that a 10 percent increase in the wage rate gives rise to a labor supply increase of between 6% and 8%.[7] The combined or compounded effect, however, is much smaller because the elasticities are proportional responses to the actual wage increase. For example, using our "high value", a 10% reduction in labor supply would result in a 4% increase in the wage rate, which in turn would produce a 3.2% increase (0.8*0.4=0.32) in labor supply.

These estimates of the labor market adjustments are incorporated into the I-O model in two ways. First, the increased wage rate is represented by adjusting household income upward by the estimated amount. These adjustments are distributed across the household income groups that

[6] The low estimate can be viewed as accounting for the fact that Borjas bases his estimations on adult males, and we know from other studies that women have a more elastic response to labor market opportunities. Thus, the inverse wage elasticity for a workforce including men and women would be somewhat lower in magnitude than the range suggested by Borjas.

[7] Aggregate labor supply elasticities have been estimated to be 1.0 in some of the literature (e.g., Chang and Kim 2005). Borjas's empirical estimates of changes in hours worked suggest values of 0.6-0.8.

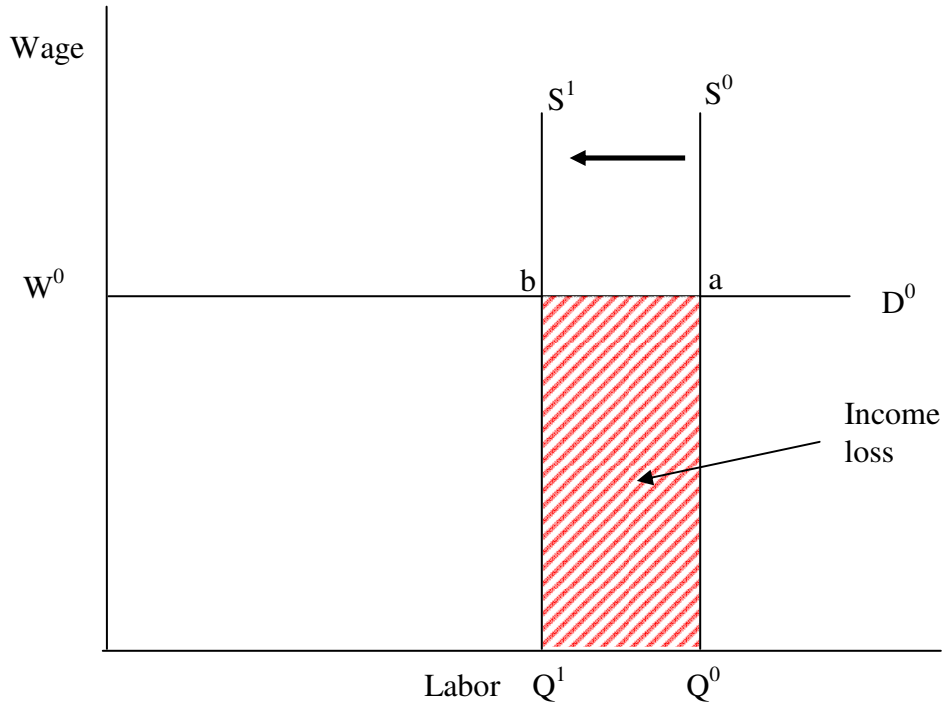
are most likely to benefit from wage adjustments for low and middle income workers. Second, employment is raised to reflect the labor market response to higher wages. Having made these adjustments, the impact results from the input-output model will generate estimates of the direct, indirect and induced effects of these changes in economic activity, consumer spending, and also tax payments.

The main distinctions between short run and long run estimates are illustrated in figure 2. Panel A reflects the labor market adjustments in the short run. The demand curve is shown to be horizontal as a way to reflect the notion that the wage, and hence demand, will not change during this initial period. If there is a reduction in the supply of workers (the supply curve shifts to the left), the new intersection of the supply and demand curves is at the same wage. With no change in the wage, there is no change in the participation of native workers in the labor market. The reduction in employment is indicated by $Q^0 - Q^1$. The loss of employee compensation is equal to the initial level (W^0Q^0) minus the new level (W^0Q^1). This change can also be expressed as $W^0*(Q^0-Q^1$, which is just equal to the shaded area.

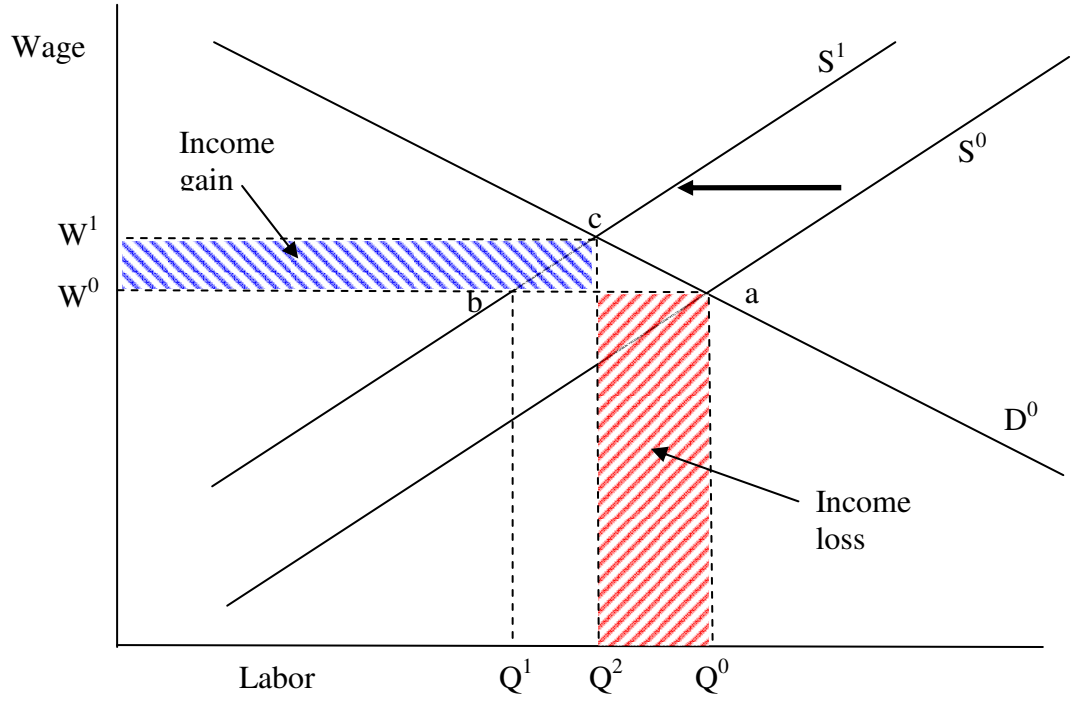
The long run adjustment is illustrated in panel B of Figure 2. Given time to adjust, both the supply and demand for labor can be represented as sloped – this reflects the reality that both supply and demand will respond to changes in the wage rate. The demand for labor declines as the wage rises, and that the supply of labor increases as the wage rises. With this change in our assumptions about the interactions of supply and demand for labor, the shift of the supply curve to the left (reflecting the 4.3% reduction in labor supply), will result in market forces exerting pressure on wages to rise. In contrast to Panel A, Panel B illustrates how the shift in the supply curve from S^0 to S^1 introduces a shortage of labor which causes upward pressure on wages (at W^0, there is a shortage of labor equal to $Q^0 - Q^1$). This pressure raises the wage from W^0 to W^1, and also encourages added labor supply, rising from Q^1 to Q^2. Equilibrium is achieved at W^1 and Q^2. Compared to the initial level of employee compensation (W^0Q^0), the new level will be higher to the extent that W1 and greater than W0, but lower to the extent that Q1 is lower than Q0. The net change can be described in graphically in Panel B of Figure 2 as the blue shaded area to the left of center reflecting $(W^1-W^0)*Q^2$ minus the red shaded area measured as $W^0*(Q^0-Q^2)$. The net effect may, in principle, be either positive or negative. If the result is a decrease in employee compensation, is will necessarily be smaller than the income loss indicated in Panel A.

Figure 2. Labor market adjustment to loss of undocumented workers: Short Run vs. Long Run

Panel A: Short Run Assumptions



Panel B: Long Run Assumptions



In response to a labor shortage, employers will consider offering a higher wage to attract labor. They may also attempt to substitute capital for (now more expensive) labor where possible. The estimates in the economic literature are intended to reflect these adjustments in supply and demand for labor resulting from changes in the supply of immigrant labor.

Table 5 summarizes the long run results for the I-O model when assuming a "low case" (where we have assumed labor market adjustments based on a 0.2 inverse elasticity). In Table 6 similar results are presented for our model assuming a "high case" (where 0.4 is assumed to be the inverse elasticity in the labor market). The results differ considerably from those for short run adjustments. Rather than a decline in employment of 7.7%, the reductions with labor market adjustments are estimated to be between 4.1% and 6.5%.[8]

For the low case the economy is estimated to see a reduction in output of $14.7 billion, corresponding to a decline in value-added of $7.2 billion. The largest component of the reduced income comes from a reduction in employee compensation of $3.9 billion, a reduction of 4.5%. In the "high case", output is lowered by $10.35 billion, with value-added declining by $4.86 billion. The reduction in employee compensation is $2.56 billion or 3.0%. The high case scenario shows smaller impacts because the labor market responses are larger: wages rise and native workers increase their labor supply, so that the short run negative impacts are offset to some extent by these increases. Indeed, in the high case, the percentage changes in all of the economic indicators except proprietor income are smaller than the reduction in the population due directly to the departure of the 150,000 undocumented workers. As a result, when expressed on a per capita basis, these indicators actually show a slight increase.

The largest percentage reduction with both low and high responses is for proprietor's income, as was the case in the short run. This is not surprising and, in fact, the figures in these tables likely understate the reductions on proprietors' incomes. This is because we do not have a readily available way to estimate the impact of these changes in proprietor's profit margins. Proprietors who pay higher wages and/or increase their use of capital, but are limited in their ability to pass these costs on to consumers, can be expected to see a decline in income. These responses are reflected in the I-O model results. Short of doing an in-depth study of specific industries, it is not feasible to evaluate the magnitude of the squeeze on proprietors' income. This

[8] Given the reduction in population owing to the departure of undocumented workers, however, this "high" case result represents a slight increase in per capita employment.

issue is discussed further in the section below on competitiveness and "very long run" effects. Details of the estimated changes in each industry or industry group (all those representing at least 0.5% of Oregon's value-added) are presented in the Appendix for both low and high cases.

Table 5. Long Term Impacts of Eliminating Undocumented Workers from Oregon: Low Case*

	Baseline model	Estimated change	Long term impacts	Percent change
Population (millions)	3,700,758	-150,000	3,550,758	-4.1%
Employment (no. of jobs)	2,264,537	-147,673	2,116,864	-6.5%
Industry output	292,351	-14,733	277,618	-5.0%
Employee compensation	86,579	-3,902	82,677	-4.5%
Proprietor income	10,482	-776	9,706	-7.4%
Other property income	41,030	-2,012	39,018	-4.9%
Indirect business tax	10,729	-521	10,208	-4.9%
Total value added	148,819	-7,211	141,608	-4.8%

* Millions of $US except where noted

Table 6. Long Term Impacts of Eliminating Undocumented Workers from Oregon: High Case*

	Baseline model	Estimated change	Long term impacts	Percent change
Population (millions)	3,700,758	-150,000	3,550,758	-4.1%
Employment (no. of jobs)	2,264,537	-108,623	2,172,120	-4.1%
Industry output	292,351	-10,357	281,994	-3.5%
Employee compensation	86,579	-2,556	84,023	-3.0%
Proprietor income	10,482	-599	9,883	-5.7%
Other property income	41,030	-1,376	39,654	-3.4%
Indirect business tax	10,729	-328	10,401	-3.1%
Total value added	148,819	-4,860	143,959	-3.3%

* Millions of $US except where noted

C. Competitiveness and Economic Structure in the "Very Long Run"

In the "very long run," impacts of a loss of undocumented immigrant labor may differ from those that have been estimated for the short and long run as defined here. There are potential negative effects as well as potential mitigating adjustments that may counterbalance some of the negative effects. One major concern frequently heard is that, because undocumented labor provides a source of low cost labor, the loss of these workers will lead to higher production costs and a loss of competitiveness for some enterprises and in some industries.

The empirical estimates from the economics literature which suggest a decline in wages with increased immigration appear to offer partial justification for these concerns. To the extent that industries substitute capital for labor, however, some of the rising labor costs could be avoided. The flexibility or "elasticity" of substituting capital for labor is crucial here. A greater ability to substitute capital for labor will help firms in adjusting to higher labor costs. Indeed, the extent of the rise in wages resulting from a loss of undocumented labor will be higher the lower is the elasticity of substitution between capital and labor.

Factors that may mitigate these effects include labor migration (e.g., between states) in response to wage differentials that may develop in different labor markets. In the case of implementing the No Match Rule, a scenario that eliminates undocumented workers nationally, there will be differential effects among regional labor markets, making it difficult to predict where wage increases will be relatively high or low.

The national scope of the No Match Rule also has implications pertaining to competitiveness. To the extent that firms in Oregon compete with other firms in Oregon or in national markets, any change in competitiveness (positive or negative) will be uncertain and will depend on whether their competitors rely relatively more or relatively less on undocumented labor. In the case of firms that compete in international markets, higher labor costs may reduce their competitiveness to the extent that it raises their cost of production. This effect is similar to the kind of effect caused by changes in the dollar exchange rate. Even though for the model estimates above an increase in average wages between 0.9 and 1.7 percent may be relatively small compared to recent declines in the value of the dollar vis-à-vis other currencies, these changes could still have adverse effects on the competitiveness of Oregon producers in some

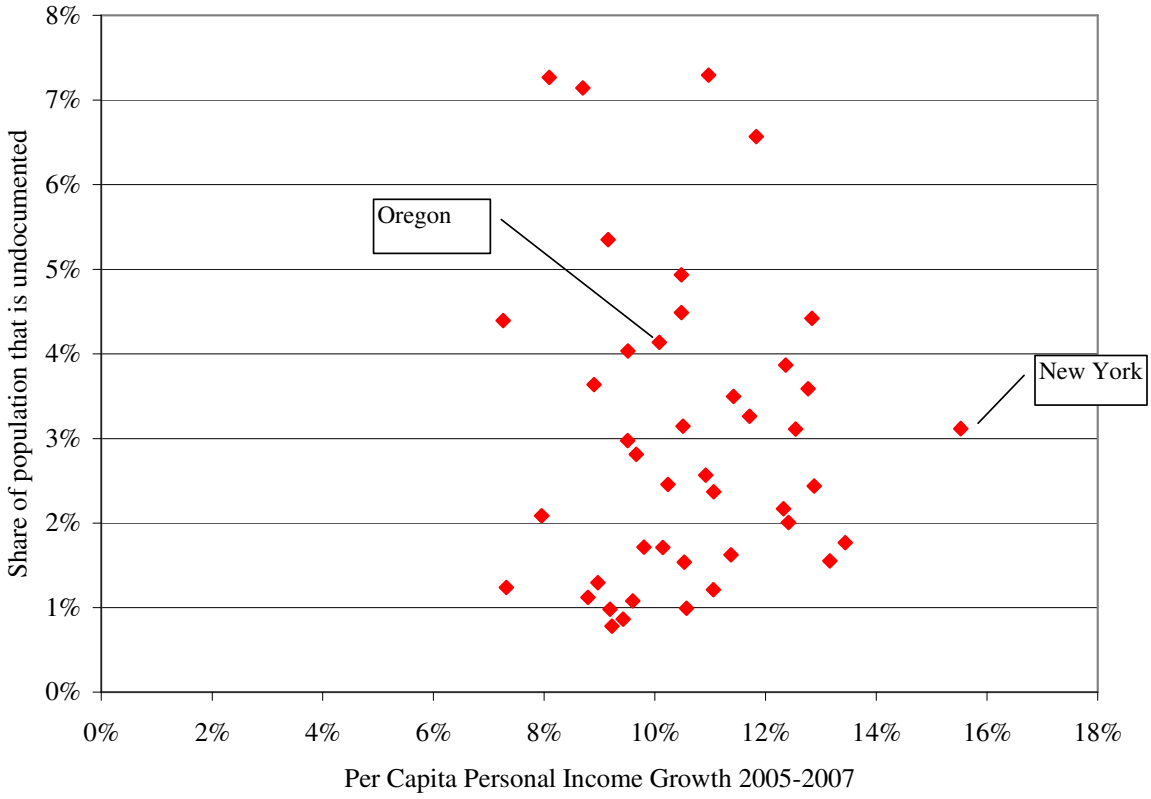
international markets, and the increases could be larger in some industries and in some labor markets.

Immigrants contribute to economic growth because they represent an increase in the population and labor force of the economy. Immigrants also contribute to economic stability because the flow of immigrants tends to be higher during an economic expansion and lower during an economic slowdown or recession. This is likely to be the case for undocumented workers as well as for authorized immigrants.

The effect of undocumented immigrants on competitiveness and growth in economic growth and productivity overall is likely to be positive. However, whether those effects are large or small is not easily measured and there are no economic studies that provide a basis for drawing conclusions in the case of Oregon. The available empirical evidence on this question does not provide strong support. For example, the differences in the shares of undocumented immigrants in the population across U.S. states shows little correlation with differences in economic growth based on the data presented in Figure 3. Indeed, even if there were a positive relationship, the causality underlying the evidence would be questionable (did the undocumented workers cause higher economic growth, or did high growth states attract more undocumented workers?).

Greenwood et al. (1996) estimate how long-run growth is affected by immigrants (recent and non-recent) and found no clear evidence of a positive effect on growth from increased immigrant labor. Whereas they found a positive effect of changes in capital on economic output, the estimated effect from recent immigration was both very small and had a negative sign (p. 61). They conclude that their analysis indicates a stronger effect in the short-run than in the long-run.

Figure 3. State-level undocumented immigrant population and growth in personal income



V. Fiscal Effects of Undocumented Immigrants

When assessing the fiscal impacts of undocumented immigrants, it is important to make a distinction between a) an estimate of the taxes contributed by undocumented immigrants and b) an estimate of the change in tax revenues that would occur as a result of the departure of undocumented workers. The departure of undocumented workers would lower both tax revenues and fiscal costs. However, on the revenue side there will likely be direct and indirect effects to consider. For example, in addition to the direct effects there will be indirect and induced effects (as estimated above) that will affect the output, spending, value-added and incomes of consumers and native workers. The departure of immigrants could affect housing and rental markets in some areas, and all of these effects would have consequences for income taxes, consumption

taxes (e.g., sales taxes in states other than Oregon), and property taxes. Consideration of these consequences suggests that estimates of the revenue losses resulting from the departure of undocumented workers will be larger than the estimates of their fiscal contributions.

The Input-Output Model for Oregon described above includes components that characterize the taxes and transfers among "institutions" (households, local government, state and federal governments). We can therefore utilize the short run and long run models to evaluate the effects of the No Match Rule on tax revenues. Some adjustments are needed however, to take account of the characteristics of the undocumented population that are not reflected in the model. In particular, many undocumented workers do not pay property taxes directly because they do not own homes. They do, however, contribute indirectly to these taxes to the extent that they are reflected in housing rental rates. More important is the estimate that only 50-70 percent of undocumented workers pay income and payroll taxes (based on several studies cited in OCPP 2007). Since the Oregon input-output model is constructed as if all workers pay these taxes, an adjustment in model's results will be necessary.

The OCPP estimates of tax contributions by undocumented immigrants are summarized in Table 2 (above). Their estimates suggest that undocumented workers pay just over $1,000 each in taxes or about 7.4% of their income. About half of this is paid in state income taxes with the remainder paid as social security taxes and Medicare taxes. OCPP has assumed that only half of undocumented workers pay income and payroll taxes and that they rent rather than own housing, which means they do not pay property taxes (directly). According to the OCPP, another 5.5% of income is paid in unemployment insurance taxes, social security taxes, and Medicare taxes which are contributed by employers on behalf of undocumented workers. The sum of all of these categories amounts to 12.9% of income, or between $231 and $323 million per year (OCPP 2007).

The estimates of changes in tax revenue from our Input-Output model are dependent on the structure of the model's assumptions about transfers between firms, households and governments. This framework, which can be incorporated into the I-O model, is called the Social Accounting Matrix. Baseline revenues can be compared to the changes in revenues estimated as part of the short-run impacts when undocumented workers are removed (short run), and also as part of the long run adjustments that occur as labor markets adjust to these changes.

Tax results from the I-O model are presented in Table 7. They indicate that the long run effects of the No Match Rule on state and local taxes will be between $476 and $731 million, or between 1.6% and 2.4% of total state and local revenues. These figures are significantly larger than those estimated by OCPP, or in studies in other states, when expressed on a "per undocumented immigrant" basis. One reason for this is that we have not made adjustments to account for the fact that many undocumented workers do not currently pay income and payroll taxes. As a result, the I-O model will overstate the reductions in revenues caused by their departure. Adjusting these results to compensate for this overestimate would reduce the annual totals by about $75 million (to between $401 and $656 million), or by $500 per undocumented workers. With these adjustments included, the I-O model estimate amounts to between $1,960 and $3,800 per undocumented immigrant, or between 45% and 135% higher than the OCPP estimates. These differences are due largely to the fact that the current analysis takes account of the labor market effects, or the indirect and induced effects that would result from the loss of undocumented workers in the economy. These estimates may also understate the impacts to the extent that they do not reflect the losses in profits or proprietors' incomes that would likely result from the increased wages paid to workers (and not fully passed on to consumers).

Table 7. Impact of Loss of Undocumented Workers on Tax Revenues

Total population (millions)	3.70	
Total Personal income*	124,588	
Personal income per capita	33,672	
Undocumented population (number)	150000	
Total annual income of undocumented workers*	2,160	
Income per undocumented individual	14,400	
Baseline tax situation		
State & local taxes paid directly by households*	6,600	
per capita	1,784	
Total state and local taxes collected*	30,134	
Federal taxes paid directly by households*	10,157	
Total federal taxes*	29,480	
Short run impacts on tax revenues		
Change in state & local taxes paid by households*	-256	
Percent change	-3.9%	
Change in total state & local*	-1,113	
Percent change	-3.7%	
Change in federal taxes*	-1,725	
Percent change	-5.9%	
Long run impacts on tax revenues	Low case	High case
Change in state & local taxes paid by households*	-212	-143
Percent change	-3.2%	-2.2%
Change in total state & local*	-731	-476
Percent change	-2.4%	-1.6%
Change in federal taxes*	-1,138	-760
Percent change	-3.9%	-2.6%
Total Change*	-2,081	-1,379
Percent change	-9.5%	-6.3%
Change in state & local taxes per undocumented inmmigrant	-4,873	-3,173

Source: I-O model results (not adjusted for tax underpayment by undocumented immigrants).
* In millions of $US.

VI. Unemployed Native Workers and Undocumented Immigrants

One frequently mentioned theme in debates about undocumented workers is that it is unfair that these undocumented workers are employed in the US at the same time that there are legal, native workers who are unemployed and looking for work. The implication of this observation is that if undocumented workers were removed from the workforce that this would open up job opportunities for the unemployed, resulting in a decline in the number of unemployed natives.

The claim that currently unemployed natives could, and would, fill the jobs currently occupied by undocumented workers is a questionable proposition that most economists reject – as mentioned in the introduction. The proposition is doubtful for a number of reasons including the following:

First, individuals who are out of work and part of the "unemployment" statistics can represent several different types of unemployment. Often a distinction is made between 1) frictional (or transitional) unemployment, 2) structural unemployment and 3) cyclical unemployment.

Frictional or transitional unemployment is the result of turn-over where persons leaving or losing a job require a period of time to find a new job, and so they are classified as unemployed during that transitional period. Given the dynamics of the US economy, there is a minimum level of unemployment believed to correspond to "full employment" (meaning that the only kind of unemployment is frictional or transitional and therefore cannot be eliminated). Estimates of the unemployment rate corresponding to full employment range around 4.5 -5.0 percent. Currently the unemployment rate in Oregon is about 6 percent. This should not be interpreted as an indication that jobs are not being created in Oregon's economy. Indeed, there is a very high rate of job creation (and job loss) in the economy, and at levels that far exceed the number of individuals who are unemployed and in need of a job. For example, Oregon Employment Department Statistics indicate that the current unemployment rate of 6% represents about 115,000 workers. At the same time, however, there are about 440,000 new jobs created every year in Oregon, and approximately 410,000 jobs are eliminated every year. Indeed, if each of those individuals who loses one of those 410,000 jobs each year spends, on average, just 14

weeks looking for a new job, these frictionally unemployed could account for all of the 115,000 workers represented by the current unemployment rate.[9]

Structural unemployment is due to changes in the economy resulting from factors like technological progress or shifts in the demand for different kinds of goods and services. As a result, some jobs in certain sectors of the economy are lost and new jobs are created in faster growing areas. The reasons for this kind of unemployment have largely to do with the need for highly specific job skills, and this is unlikely to be an area where substitution of unemployed native workers for undocumented workers would occur. Persons who are structurally unemployed often do not have marketable job skills and as a result they may face long periods of unemployment.

Finally, cyclical unemployment is unemployment that varies with fluctuations in economic activity (e.g., during recessions but not expansions). The relevance of this kind of unemployment to the question of undocumented workers is unclear. If undocumented workers were expelled in a recession it could make some jobs available to native workers, but it would also lower consumer spending because undocumented workers are consumers also. More importantly, however, undocumented workers actually help stabilize the economy around these kinds of business cycles because the flow of undocumented workers tends to rise during economic expansions and decline in economic downturns. In that way, undocumented workers already provide some useful 'softening' of the impacts of these economic fluctuations.

In addition to distinguishing among the different types of unemployment, there are other reasons why it is unlikely that many of Oregon's native unemployed would be able to substitute for undocumented workers. The main obstacle is that there will frequently be a mismatch between unemployed natives and undocumented workers in terms of skills, education and location. For unemployed natives to take the jobs of undocumented workers, there would need to be a good fit (sufficient skill to do the job, but not overqualified so as to refuse the job). One measure of this mismatch has been examined nationally by economist David Jaeger (2006). He points out that when native workers needing jobs in different education groups are compared to estimates of the undocumented workers in those education groups, the potential for substitutions is limited. For example, among those with less than a 9th grade education, there are 2.5 million undocumented workers but only about 0.1 million native workers in need of employment -- so

[9] Indeed, Kletzer (1992) estimates that the average period of frictional or transitional unemployment is 17 weeks.

less than 1/20th as many native workers in need of jobs with similar skill levels. By contrast, among those with some college education there are an estimated 770,000 undocumented workers but 2.3 million native workers in need of jobs -- so only 1/3rd of these native workers could, even potentially, replace undocumented workers in the same education category (See Table 8).

Returning to our Oregon-specific data, if 4.5% is the frictional unemployment rate, then that suggests that only one-quarter of Oregon's 115,000 unemployed, or 29,000, are without work for other than 'frictional' reasons. For the other reasons described above, it is unlikely that more than a small fraction of these 29,000 would be in a position to take advantage of opportunities to replace departing undocumented workers. Moreover, the combination of frictional unemployment (4.5%) and structural unemployment (0.5 - 1.0 %) could account for essentially all of Oregon's unemployment. In fact, the US Federal Reserve Bank begins to worry about inflationary pressures when the unemployment rate declines to about 5%, a level they consider to be full employment, where undesirable upward pressure on prices would begin to occur.

Table 8. Comparison of Number of Native Workers Needing Jobs and Number of Employed Undocumented Immigrants (individuals aged 18-64)

Education Group	Natives Workers in Need of Employment Jan 2006	Share of Undoc. Immigrants 2004	Estimated Number of Undocumented Workers Jan 2006	Potential Unfilled Jobs Jan 2006
Less than 9th Grade	105,000	32%	2,464,000	2,359,000
9th-12th Grade	1,203,000	17%	1,309,000	106,000
High School	3,148,000	25%	1,925,000	- 1,223,000
Some College	2,307,000	10%	770,000	- 1,537,000
College or more	1,372,000	15%	1,155,000	- 217,000
Total	**8,135,000**		**7,700,000**	**- 512,000**

Notes: Share of Undocumented Immigrants in each education category is taken from Passel (2005). Estimated Number of Undocumented Immigrants assumes that the 7,200,000 undocumented workers calculated by Passel (2006) in March 2005 were supplemented by another 500,000 entering between March 2005 and January 2006.

Source: Reproduced from David A. Jaeger, 2006. Replacing the Undocumented Work Force. Center for American Progress.

VII. Summary and Conclusions

Undocumented immigrants are currently estimated to comprise 4.1 percent of Oregon's population and 4.3 percent (97,500 workers) of Oregon's workforce. This study has examined how implementation of a national "No Match Rule" would likely affect Oregon's economy if all undocumented immigrants were to leave. Based on the kinds of labor market adjustments that we would expect to occur following the decline in labor availability due to the departure of Oregon's undocumented immigrants, the current analysis finds that in the immediate or short run, employment might decline by 173,500 jobs, or 7.7%. This decline is greater than the number of undocumented workers because their departure would have ripple effects throughout the economy for two reasons. First, because of the interconnections among industries who buy and sell products from each other and, second, because undocumented workers are also consumers and their departure would lower consumer spending. These immediate or short run impacts are expected to be short-lived, since they are based on the assumption that prices and markets have not had time to adjust.

With time, markets including wages in labor markets, would adjust. We would expect some upward pressure on wages, and as wages increased slightly there would be a supply response among native workers, and also some substitution of capital for labor. With these long-run adjustments in mind, the current analysis estimates that the departure of undocumented workers could produce, in the long-run, a loss of between 108,600 jobs and 147,600 jobs in Oregon, or between 4.1% and 6.5%. Economic output would decline by between 3.5% and 5%, and value-added would drop between 3.3% and 4.8%. Some of this decline would be due directly to the departure of undocumented immigrants who are both productive workers and consumers who spend a substantial portion of their incomes in Oregon. Some of the decline in the long run would be due to the ripple effects or multiplier effects that these changes cause throughout the economy. The adverse effects on economic output are estimated to be largest in agriculture, service industries such as cleaning, food preparation and related industries, construction and transportation.

Whether these numbers are viewed as being large or small will depend on how they are framed or compared. These percentage declines in economic output, for example, are comparable to the average annual growth rate of Oregon's economy overall. By implication, the

sudden loss of undocumented workers could potentially offset the entire gains in Oregon's growing economy for an entire year, turning an economic expansion into stagnation. By contrast, these estimated job losses for the analysis -- between 108,600 and 147,600 jobs lost – are similar to the number of jobs created every three or four *months* in Oregon (110,000 – 146,000), and also the number of jobs typically eliminated every three or four months (102,000 – 136,000). Also, if these results are expressed per million population or per capita, most economic indicators actually increase. Indeed, in the analysis for the High Case summarized in Table 6, all indicators increase except proprietor's income when evaluated on a per capita basis. This is in part because undocumented workers earn below average incomes, so that their departure raises the mean level of income per person in the economy.

These statistics on average percentage impacts on wages, employment, or value-added no doubt disguise the fact that some industries would be minimally affected while others would experience substantial losses and would have great difficulty adjusting. The consequences could be particularly severe in industries that are labor-intensive, those that rely relatively heavily on undocumented workers, and those for which there are few options for substituting capital for labor (e.g., agricultural tasks that must be done by hand).

On the question of fiscal effects, the current analysis estimates impacts on state and local revenues that are larger than those estimated for other states (on a per-undocumented-immigrant basis), or those estimated elsewhere for Oregon (based on a recent study by OCPP). Indeed, the current study estimates a loss of state and local revenues – if undocumented immigrants were to leave – of between $401 million and $656 million annually (when adjusted to take account of estimated underpayment of income and payroll taxes by undocumented workers). This range is between 45% and 135% higher than the corresponding OCPP estimate (for the same population of undocumented workers as has been assumed here). The differences in estimates appear to be due to the distinction between a static analysis (estimated current tax contributions of undocumented immigrants) and a dynamic analysis (estimated change in revenues if undocumented immigrants departed).

Insufficient information exists to conclude that Oregon's undocumented workers are a net drain on state and local public resources. Of five known state-wide studies, two concluded that state revenues exceed spending for undocumented immigrants; two found that spending exceeded revenues, and one found them to be about equal.

On the question of whether Oregon's unemployed could, and would, take the jobs left vacant by the departure of undocumented workers, the evidence and economic analysis of this question find little support for the idea. The two main reasons for this appear to be the fact that most unemployment is frictional or transitional, and secondly because there is a severe "mismatch" problem between the skill levels of undocumented workers and those of unemployed natives. Geographic mismatches, and mismatches in the job expectations of the unemployed, would only reinforce these obstacles.

A number of caveats should be mentioned. Although this study is based on the best available data and the most recent economic research, the lack of detailed data limits the precision with which we can a) characterize the role of undocumented immigrants in Oregon's economy and b) model and differentiate the ways in which different segmented and specialized labor markets and industries will be able to adjust and respond to a loss of undocumented workers. Because these immigrants are undocumented, the information we have about them must be seen as approximate and suggestive. These approximations carry over into the ways in which undocumented workers have been represented in the economic models as workers, consumers and tax payers. Despite these caveats, the results of the current analysis appear to be quite consistent with the economics literature, including the many regional and national empirical studies of immigration based on detailed time-series data.

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Appendix Tables

Appendix Table 1. Base Case Model for Oregon Analysis of Undocumented Immigrants

Industry	Industry Output*	Employment	Employee Compensation*	Proprietor Income*	Total Value Added*
Other industries including undocumented workers	60,248.090	809,509	16,941.090	3,824.650	34,162.774
Wholesale trade	15,939.236	87,458	5,683.106	353.713	10,749.171
Owner-occupied dwellings	11,734.914	0	0.000	0.000	10,478.247
Construction	17,231.082	140,532	5,256.668	1,519.603	7,836.857
State & Local Education	7,563.428	145,533	6,935.942	0.000	7,563.429
State & Local Non-Education	6,781.323	78,761	6,218.723	0.000	6,781.324
Farming	13,697.862	114,937	2,433.399	801.661	5,133.017
Offices of physicians- dentists- and other	6,329.172	60,942	3,024.105	778.336	4,471.115
Food preparation	11,645.283	141,472	2,649.266	102.473	4,082.916
Semiconductors and related device manufacturing	21,096.836	25,039	3,137.305	8.792	3,516.734
Cleaning	6,134.488	110,252	1,972.798	286.636	3,406.316
Management of companies and enterprises	5,566.766	29,748	2,493.687	(0.696)	3,212.761
Hospitals	5,663.092	48,926	2,746.641	31.425	3,059.751
Monetary authorities and depository credit	4,144.427	19,517	982.365	26.860	2,963.296
Motor vehicle, parts dealers	3,235.010	30,109	1,363.885	140.350	2,133.524
Power generation, supply	2,218.694	3,292	332.119	154.711	1,803.559
Insurance carriers	4,524.985	18,458	1,104.853	84.942	1,782.331
Software publishers	3,139.603	9,970	879.710	43.038	1,732.931
Truck transportation	3,458.932	25,511	1,069.625	197.967	1,666.197
Other State and local government enterprises	3,198.291	10,825	923.463	0.000	1,601.907
Federal Non-Military	1,552.130	10,538	1,441.810	0.000	1,552.130
Telecommunications	3,221.115	10,078	592.716	22.359	1,473.623
Other ambulatory health care services	2,682.848	15,718	845.028	212.532	1,462.401
Nondepository credit intermediation and rela	2,253.676	13,201	919.691	24.183	1,441.409
Insurance agencies- brokerages- and related	1,648.253	13,643	663.568	47.309	1,406.709
Sawmills	2,723.008	9,108	492.761	35.264	960.549
Paper and paperboard mills	2,299.927	3,588	360.191	39.914	795.032
Federal electric utilities	1,064.933	1,635	206.108	0.000	745.932
Federal Military	739.281	12,409	670.753	0.000	739.281

* Includes all industries accounting for 0.5% of Value-added

Appendix Table 2. Combined Impacts (Low Case) for Loss of Undocumented Immigrants

Industry	Base Employment	Change in Employment	Base Total Value Added*	Change in Total Value Added
Other industries including undocumented workers	809,509	(31,216.9)	34,162.774	(1,317,411,456)
Wholesale trade	87,458	(2,206.9)	10,749.171	(271,246,016)
Owner-occupied dwellings	0	0.0	10,478.247	(230,519,296)
Construction	140,532	(17,822.4)	7,836.857	(993,876,224)
State & Local Education	145,533	(1,302.0)	7,563.429	(67,663,096)
State & Local Non-Education	78,761	(704.2)	6,781.324	(60,630,356)
Farming	114,937	(35,999.8)	5,133.017	(1,607,736,960)
Offices of physicians- dentists- and other	60,942	(424.1)	4,471.115	(31,114,384)
Food preparation	141,472	(16,298.1)	4,082.916	(470,367,520)
Semiconductors and related device manufacturing	25,039	227.3	3,516.734	31,922,798
Cleaning	110,252	(20,988.3)	3,406.316	(648,448,832)
Management of companies and enterprises	29,748	(528.9)	3,212.761	(57,125,904)
Hospitals	48,926	(414.8)	3,059.751	(25,941,352)
Monetary authorities and depository credit	19,517	(289.3)	2,963.296	(43,929,092)
Motor vehicle, parts dealers	30,109	(420.3)	2,133.524	(29,779,086)
Power generation, supply	3,292	(81.5)	1,803.559	(44,647,892)
Insurance carriers	18,458	(186.9)	1,782.331	(18,045,240)
Software publishers	9,970	(13.2)	1,732.931	(2,290,712)
Truck transportation	25,511	(970.6)	1,666.197	(63,394,688)
Other State and local government enterprises	10,825	(242.1)	1,601.907	(35,826,480)
Federal Non-Military	10,538	0.0	1,552.130	0
Telecommunications	10,078	(233.9)	1,473.623	(34,207,904)
Other ambulatory health care services	15,718	(39.6)	1,462.401	(3,681,090)
Nondepository credit intermediation and rela	13,201	(374.3)	1,441.409	(40,865,212)
Insurance agencies- brokerages- and related	13,643	(89.0)	1,406.709	(9,180,633)
Sawmills	9,108	(75.2)	960.549	(7,933,749)
Paper and paperboard mills	3,588	(0.0)	795.032	(8,418)
Federal electric utilities	1,635	(39.1)	745.932	(17,829,072)
Federal Military	12,409	0.0	739.281	0

* Includes all industries accounting for 0.5% of Value-added

Appendix Table 3. Combined Impacts (High Case) for Loss of Undocumented Immigrants

Industry	Base Employment	Change in Employment	Base Total Value Added*	Change in Total Value Added
Other industries including undocumented workers	809,509	(11,959.6)	34,162.774	(504,719,520)
Wholesale trade	87,458	(347.4)	10,749.171	(42,695,808)
Owner-occupied dwellings	0	0.0	10,478.247	(80,832,176)
Construction	140,532	(16,173.0)	7,836.857	(901,893,504)
State & Local Education	145,533	1,427.1	7,563.429	74,167,240
State & Local Non-Education	78,761	772.5	6,781.324	66,509,724
Farming	114,937	(34,091.6)	5,133.017	(1,522,518,144)
Offices of physicians- dentists- and other	60,942	1,030.8	4,471.115	75,625,176
Food preparation	141,472	(14,107.4)	4,082.916	(407,144,640)
Semiconductors and related device manufacturing	25,039	552.8	3,516.734	77,642,640
Cleaning	110,252	(18,563.2)	3,406.316	(573,524,480)
Management of companies and enterprises	29,748	97.3	3,212.761	10,509,982
Hospitals	48,926	865.2	3,059.751	54,105,564
Monetary authorities and depository credit	19,517	170.2	2,963.296	25,844,104
Motor vehicle, parts dealers	30,109	262.3	2,133.524	18,588,948
Power generation, supply	3,292	(42.3)	1,803.559	(23,171,260)
Insurance carriers	18,458	198.7	1,782.331	19,182,432
Software publishers	9,970	(4.3)	1,732.931	(741,073)
Truck transportation	25,511	(426.9)	1,666.197	(27,881,908)
Other State and local government enterprises	10,825	(128.9)	1,601.907	(19,070,832)
Federal Non-Military	10,538	0.0	1,552.130	0
Telecommunications	10,078	(102.8)	1,473.623	(15,032,745)
Other ambulatory health care services	15,718	299.4	1,462.401	27,856,672
Nondepository credit intermediation and rela	13,201	(202.4)	1,441.409	(22,097,276)
Insurance agencies- brokerages- and related	13,643	90.4	1,406.709	9,322,650
Sawmills	9,108	(61.1)	960.549	(6,444,925)
Paper and paperboard mills	3,588	(0.0)	795.032	(5,490)
Federal electric utilities	1,635	(19.8)	745.932	(9,043,337)
Federal Military	12,409	0.0	739.281	0

* Includes all industries accounting for 0.5% of Value-added