Educational Attainment and Border Income Performance

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Large numbers of the new entrants to the state labor market will find it difficult to obtain above-average salaries. For the border zone collectively, nearly $3.6 billion in forgone income results from a secondary school dropout rate that exceeds the state average.

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As Texas enters the new millennium, two important trends are influencing regional economic performance. Demographically, the state population is rapidly becoming more ethnically diverse, but many of the migrants from Mexico and Central America have not graduated from high school. Simultaneously, the majority of new jobs continue to emerge in service segments of the Texas economy. Together, these developments imply that large numbers of the new entrants to the state labor market will find it difficult to obtain above-average salaries. High-salary positions are available in service sectors, but they typically require education beyond that of a high school degree.

It is widely recognized that income is positively correlated with education. The primary link is through the improvement in human capital that results from the educational process (Becker 1993). Education is not the only means by which human capital can be improved, but it is one of the most important. As economies become more advanced, education's role in enhanced worker productivity is fairly pronounced (Becker 1993, Welch 1970). Given the widespread evidence regarding education and income, greater schooling achievement is probably essential if the border region is to approximate the higher earnings observed elsewhere in Texas.

The importance of potential income gains to border economies is readily apparent. For example, population growth was strong during the 1990s in four of the border metropolitan areas: Brownsville, El Paso, Laredo, and McAllen. Accompanying that growth was substantial new commercial activity, including large increases in retail sales (Woods and Poole Economics, 2000). Per capita income performance in these markets was less encouraging. By the end of the decade, all four ranked 305th or worse out of the 318 metropolitan areas defined by the Census Bureau. These urban areas also lagged the rest of the nation in educational attainment (Woods and Poole Economics, 2000).

Recent work in regional economics has attempted to quantify the relationship between education and income at both state and county levels (Ashenfelter and Krueger 1994, Domazlicky et al. 1996, Sloboda 1999, Levernier, Partridge, and Rickman 2000). These techniques can be used to estimate income gains associated with different schooling levels across Texas. As has been documented elsewhere, one challenge facing the state economy is unequal income performance, especially in border areas (Sharp 1998, Sáenz 1999, Fullerton 2000). In 1998, for instance, per capita incomes for Brownsville, El

Paso, Laredo, and McAllen ranged between 50 and 65 percent of the state average of $25,370 (Diffley 1999). Overcoming those gaps will undoubtedly take years and depend in large measure upon increased schooling in each metropolitan economy. The latter assertion implicitly assumes that higher paying jobs also materialize via regional demand for labor, but such a pattern is hardly unique during the postwar history of the United States. In fact, the absence of skilled workers may serve to discourage investment flows from companies producing advanced products.

To shed light on the links between education and income performance, socioeconomic data were collected for all 254 Texas counties from the 1990 census and from the Regional Economic Information System, both published by the Department of Commerce. Cross-section econometric modeling was used to estimate the relationship between per capita income levels and the various regressors. The regression output was then used to simulate the impact of higher graduation rates for border counties in the state.

LITERATURE REVIEW

Several studies in recent years have examined the relationship between education and regional income performance, but there have been relatively few efforts to empirically quantify this for Texas border counties. Given this, it is important to review evidence reported for other regions to provide a backdrop against which the current effort can be compared. A limited synopsis of similar studies follows.

Below-average graduation rates occur in regions other than the border with Mexico. Some of the most recent research on this topic has been compiled for rural areas of the nation where more than 14 percent of all families are estimated to have lived in poverty in 1990 (Levernier, Partridge, and Rickman 2000). Domazlicky et al. (1996) and Sloboda (1999) concentrate on southern portions of Missouri and Illinois, while Rickman (1993) examines a southern section of Georgia. These studies offer broad support for the association between human capital and labor productivity documented in other papers (Ashenfelter and Krueger 1994, Miller, Mulvey, and Martin 1995). More specifically, failure to complete high school is associated with statistically significant negative impacts on per capita incomes in all three regions considered in those states. In each study, the impacts total several hundred dollars on a per capita basis and several hundred million dollars on a regionwide basis.

In Texas, issues involving education and income are increasingly important (Crowder 1999). The population is rapidly becoming more ethnically diverse and less educated (Murdock 1999). Concurrently, the number of well-paying blue-collar jobs is falling, leaving service sector positions as the best new-job opportunities for Texans (Diffley 1999, Nakamura 2000). Implications for the state labor market are fairly straightforward. Access to high-salary positions will more frequently require education beyond a high school degree.

As state labor markets in Texas have become more service-oriented, regional income distributions have suffered at the expense of border areas (Sharp 1998, Sáenz 1999). Reversing these trends is feasible but is likely to be a long-term process because it will entail improving educational performance at a variety of levels over several years (Buchner 1999, Dittmar and Phillips 1999). Failure to address the task quickly can only result in deepening problems as information-age labor markets become increasingly competitive (Cox and Alm 1999).

Despite the absence of immediate headline results from such endeavors, addressing the border region education shortfall will generate numerous economic benefits. Many of these improvements will come as positive externalities (Taylor 1999). First-best externalities include higher wages, higher real estate values, more rapid employment growth, and greater firm entry rates. Second-best externalities from increased regional educational attainment include higher community income levels, lower crime rates, stronger tax bases, lower per capita social transfer payments, reduced use of public health systems, lower poverty rates, and greater attraction of extraregional private sector investment.

While labor demand fluctuations will influence regional income opportunities, there is widespread agreement that raising aggregate human capital stocks improves economic well-being. In some cases, econometric techniques have provided empirical estimates of the dollar value that can be generated by improving a geographic area's educational attainment. Preliminary estimates also corroborate this type of relationship in a cross section of states in Mexico using 1990 census data for that economy (Messmacher Linartas 2000). To date, such an effort has not been attempted for the border counties of Texas. The following sections summarize the procedures and results of such an exercise.

Table 1
Variable Names and Definitions

Variable	Definition
PCINC	County per capita income level in 1990
HSDR25	Percentage of adults 25 or older that did not finish high school
HSGR25	Percentage of adults 25 or older that attended some college
COGR25	Percentage of adults 25 or older that graduated from college
POPGT65	Percentage of county population age 65 or older in 1990
POPLT18	Percentage of county population age 18 or younger in 1990
PCTENGL	Percentage of monolingual English households for county in 1990
PCTBLNG	Percentage of bilingual households for county in 1990
PCTSPNH	Percentage of monolingual Spanish households for county in 1990
URBAN	Dummy = 1 if 1990 population exceeds 599,999; zero otherwise
BORDER	Dummy = 1 if county is adjacent to Mexico; zero otherwise

DATA AND METHODOLOGY

Information on years of formal schooling and degrees completed was collected for all 254 Texas counties. These data are available in the social and economic characteristics information files of the Census Bureau. Estimates of 1990 per capita income levels were also assembled for each county, using revised estimates from the Regional Economic Information System files of the Bureau of Economic Analysis.

Previous regional income performance studies used per capita income estimates as the dependent variables in their equation specifications (Rickman 1993, Domazlicky et al. 1996, Sloboda 1999). Explaining variations in border per capita incomes requires expanding the independent variable vector beyond that used in those earlier efforts. This is because Texas' demography is more heterogeneous than that of other regions of the national economy. Among other things, household sizes along the border tend to be much larger than those in the rest of Texas and the nation (Murdock 1999, Schick and Schick 1991). Limited English language skills in border counties also have been shown to affect earnings performance (Dávila and Mora 2000, Mora and Dávila 1998).

Right-hand-side regressors include the percentage of adults in each county who are 25 or older and dropped out of high school, are 25 or older and graduated from high school and attended some college, and are 25 or older and graduated from college. Increases in the percentage of high school dropouts are expected to depress county incomes, while increments in the percentages of both graduate categories are likely to improve earnings. Also included among the explanatory variables for each county are the female labor force participation rate, the percentage of the population 65 or older, and the percentage 18 or younger. Increases in female labor force participation should raise county incomes. An ambiguous relationship exists between the proportion of retirement-age adults and income. Many of these persons drop out of the labor force but simultaneously begin receiving sizable transfer payments. As the percentage of youth increases in a county, per capita income is likely to decline because individuals younger than 18 generally do not work or hold only part-time positions.

Several demographic explanatory variables that measure each county's language characteristics are also tested. English and bilingual language skills are expected to increase per capita incomes, while monolingual Spanish skills are likely to reduce earnings in U.S. labor markets. Geography and industry mix can also affect income performance (Ciccone and Hall 1996, Glaeser 1998). Three qualitative variables are used to capture these possibilities. An urban dummy for large counties with 1990 populations of 600,000 or greater is expected to coincide with higher earnings. A second dummy for smaller metropolitan counties with populations ranging from 200,000 to 599,999 is anticipated to be associated with moderately higher incomes. Finally, a border dummy is likely to correspond with lower earnings performance. Using the approach suggested by Peach and Adkisson (2000), border counties are defined as those immediately adjacent to Mexico. Variable mnemonics are presented in Table 1.

Least-squares regression techniques are used to estimate the various specifications tested. Because of large divergences in Texas county populations, residuals are tested for heteroskedasticity. For example, Harris County had more than 2.8 million residents in 1990; at the other extreme, Loving County had a population of 106 in 1990.

The cross-section econometric estimates quantify the relationships between education and regional incomes across the state. County per capita incomes are used as the dependent variable. This choice is made because per capita income estimates include wage and salary disbursements as well as proprietor earnings, dividend payments, and retirement transfers, all of which are positively correlated with human capital. The regression estimates are used to examine border area impacts of changes in educational attainment. Because of minor reporting and nonreporting errors, census data aggregates for Texas county school achievement provide imperfect measures of actual school district performance (Murdock 1999). The county census estimates do offer, however, one means by which to analyze potential gains. Impacts can also be calculated for more broadly defined regions of the state, such as the Panhandle, the Hill Country, the Metroplex, and so forth. Results for the border regions are of particular interest, given existing economic and demographic differences between these counties and Texas as a whole.

One possible weakness of the approach selected should be pointed out. As with earlier studies of other regions, the methodology employed implicitly assumes the quality of schooling is equal across all 254 counties in the state. This is probably not the case in a state as large and diverse as Texas. Whether such differences significantly weaken the results shown below is not addressed in this article. This topic may, however, merit additional attention (see Becker 1993).

Additionally, greater investment in human capital generates regional income gains only in those cases in which labor force quality improves and local labor supplies increase. Graduates in any region commonly choose to pursue jobs in other markets. Recently, the entire graduating class from one technical institute in El Paso accepted out-of-state jobs with a nationally prominent silicon chip maker (Mrckvicka 2000). In extreme form, labor mobility could lead to situations in which improved educational attainment in border counties would not raise aggregate income. This eventuality is not examined in this article but may warrant more careful consideration in subsequent research efforts.

A final potential problem with the parameter estimates is that returns to education will also vary with the characteristics of labor demand at the county level. With regard to the Texas border region, many counties have relatively large government sectors with union membership contingents, such as the Border Patrol and military installations. Because the extent and nature of union membership and other county-level labor demand variables are not controlled within the various equation specifications, the education parameter estimates are likely biased. In the case of labor unions, the biases may even be negative. A potential step to consider in future work is the inclusion of 1980 and 2000 census results and the use of county fixed effects. Doing so could help sort out county-specific effects from the general relationship between education and income.

Table 2

White Procedure for Heteroskedasticity Test with Cross Terms

Equation	Computed test statistic, $254 \cdot R^2$	Chi-square probability
T3	89.303	0.004

EMPIRICAL RESULTS

Heteroskedasticity is present in the sample. Chi-square results for the majority of the initial ordinary least squares estimates point to the presence of systematically unequal residual magnitudes with test statistics that exceed 5 percent critical values. Table 2 reports the White (1980) heteroskedasticity test result for the equation version used in calculating the per capita, county, and regional income impacts. Accordingly, the covariance matrix for the model reported in Table 3 has been reestimated using White's (1980) procedure.[1] A discussion of general empirical characteristics follows. The basic equation form tested is:

$$PCINC_i = B_0 + \text{Sum}(B_j X_{ji}) + e_i,$$

where $i = 1,2,3,\ldots,254$ for each of the counties in Texas and $j = 1,2,3,\ldots,k$ depending on the number of independent variables employed. With respect to the statistical output reported for the model used in the income impact simulations below, $k = 10$.

Overall statistical traits of the various specification estimates are favorable. All the adjusted R-squared coefficients of determination are greater than 40 percent, a fairly strong goodness-of-fit for heterogeneous cross-sectional data. In many cases, some of the computed t statistics fail to satisfy the 5 percent statistical significance guideline for type I errors. All the model F statistics for joint significance, however, surpass their respective 1 percent critical values. Although detailed statistical outcomes for only one model specification are shown in Table 3, all the various log likelihood estimates for each specification format are clustered closely together.

The central hypothesis being tested is that Texas border county incomes are affected by educational attainment in a manner similar to that of other regions of the United States. To examine that possibility, three different human capital variables are included in the equation shown in Table 3. The first of these regressors is the percentage of adults 25 years or older in each county who failed to graduate from high school. As in previous studies, this variable is associated with a negative impact on county per capita income. Its computed t statistic does not quite reach the 5 percent significance level, but

Table 3
County Per Capita Income Regression Output Using White Procedure

Variable	Coefficient	Standard error	*t* statistic	Probability
Constant	7059.761	7670.249	.920408	.3583
HSDR25	–103.8998	58.35719	–1.780412	.0763
HSGR25	143.1058	93.50420	1.530475	.1272
COGR25	144.4096	63.58679	2.271063	.0240
PCTBLNG	–81.49451	55.46333	–1.469341	.1430
PCTENGL	–36.09971	53.79102	–.671110	.5028
PCTSPNH	34.97376	158.0863	.221232	.8251
POPGT65	200.7548	75.29035	2.666408	.0082
POPLT18	283.9618	113.4229	2.503566	.0130
URBAN	2837.218	1197.363	2.369556	.0186
BORDER	–3179.338	1262.435	–2.518417	.0124

R-squared	.433397	**Dependent variable mean**	14711.18
Adjusted R-squared	.410080	**Dependent variable S.D.**	3385.411
S.E. of regression	2600.206	***F* statistic**	18.58721
Sum of squared residuals	1.64E+09	***F* statistic probability**	.000000
Log likelihood	–2352.078	**Observations**	254

NOTE: Sample data from 1990 census.

its parameter magnitude, negative $104, is close to those reported for other regional economies.

The next right-hand-side variable used in the models is the percentage of adults 25 or older in each county who graduated from secondary school and attended some college but without obtaining a bachelor's degree. As hypothesized, this variable generates a positive coefficient. In the model detailed in Table 3, however, the *t* statistic for this parameter falls below the 5 percent significance threshold. Nevertheless, results across a variety of specifications not reported are sufficiently consistent to indicate that graduation from high school and partial college attendance raise county per capita incomes in Texas (see McCloskey and Ziliak 1996).[2] The third regressor is the percentage of adults 25 or older who successfully completed at least a four-year college degree. This regression parameter is greater than zero and satisfies the 5 percent type I error criterion.

Although most labor and other market transactions in the United States are conducted in English, substantial numbers of border residents in Texas speak Spanish as their primary language. Because communication skills can have important implications for personal income, the results shown in Table 3 are surprising. None of the three language skill independent variables obtains a computed *t* statistic that satisfies the standard type I error criterion.[3] Separate research using Census Bureau public-use microdata samples has uncovered patterns of language–income interplay (Dávila and Mora 2000, Mora and Dávila 1998). Presumably, some of the language impacts are accounted for by the border county qualitative regressor in Table 3, but experimentation with interaction specifications (Pindyck and Rubinfeld 1998) did not yield significant results.[4]

The parameter estimate for the percentage of the population over age 65 carries a positive sign and, as in Domazlicky et al. (1996), has a *t* statistic that exceeds the 5 percent critical value. Unexpectedly, the coefficient estimated for the percentage of the county population aged 18 years or younger is greater than zero. While Sloboda (1999) reports a similar result for Illinois, the parameter reported in Table 3 is also statistically significant. Although an increase in the number of people in this age group raises a county's dependency ratio, for the data sample used in this study, it is also associated with a per capita income increase of $284.[5]

As in numerous other regional economic articles, in this study residency in urban areas is associated with higher per capita incomes. Large metropolitan counties with 1990 populations of 600,000 or greater exhibit per capita incomes roughly $2,840 above those for other

Texas counties. This dummy variable coefficient has a significant *t* statistic.[6] In contrast to the urban effect, border county per capita income falls below other state regions by approximately $3,200. As with the large urban dummy variable, the border parameter also surpasses the 5 percent significance threshold.

Tables 4, 5, and 6 use the county per capita income regression coefficients to calculate the impact on per capita income of raising each county's educational achievement to the 1990 state averages for high school graduation, high school graduation plus some college attendance, and college graduation. Because its respective graduation rates are higher than those of Texas as a whole, Brewster County, in the Big Bend region of the state, is excluded from the analysis. Similarly, Jeff Davis County, also located in far West Texas, is excluded from the calculations in Table 6 because its college graduation rate exceeds that of the rest of the state.

The implied effects of reducing secondary school noncompletion are striking (*Table 4*). The single largest gain—$5,760 per person—is obtained for Starr County in the Rio Grande Valley. Other things remaining equal, raising its high school graduation rate to the state average would permit Starr County to more than double its 1990 per capita income. The aggregate impact for the county would be to raise total 1990 personal income by more than $210 million.

In nearby Hidalgo County, the implications are similarly impressive. Income per person rises by more than $3,600 in the simulation exercise. Due to the county's relatively large population, that translates to a countywide estimate in excess of $1.26 billion. Aggregate personal income gains of more than $400 million also result for Cameron, El Paso, and Webb Counties. For the border zone collectively, nearly $3.6 billion in forgone income results from a secondary school dropout rate that exceeds the state average. Given the limited tax bases of the border region, the benefits of improving high school graduation rates are clear.

Table 5 illustrates the potential improvements of increasing to the state average the proportion of border county residents that not only graduate from high school but also attend some college. While less dramatic than the income gains shown in Table 4, the results are still noteworthy. On a per capita basis, the largest impact exceeds $2,000, once again for Starr County. For the entire border region, the per person income improvement is estimated at $711. The $413 million aggregate figure for Hidalgo County represents the largest total gain of any single jurisdiction in the sample. Increasing to the state average the percentage of border county residents who attend college following high school would raise total income by $975 million.

Table 6 details the implied gains from raising border county college graduation rates to a level commensurate with Texas as a whole. The income impacts are again substantial on a per capita as well as an aggregate basis. Estimates range from $736 per person in El Paso County

Table 4
Implied Income Losses Due to High School Noncompletion

County	Per capita impact	Aggregate impact (in millions)
Brewster	Not calculated	Not calculated
Cameron	$3,143	$ 744.7
El Paso	1,195	643.8
Hidalgo	3,627	1,262.5
Hudspeth	3,413	9.2
Jeff Davis	370	0.7
Kinney	2,261	6.6
Maverick	5,177	170.4
Presidio	4,011	24.5
Starr	5,760	210.2
Terrell	825	1.1
Val Verde	2,276	80.1
Webb	3,456	413.8
Zapata	3,129	26.3
Border zone	$2,620	$3,593.9

NOTES: All impacts calculated in dollars for 1990 completion rates relative to the Texas average. Border zone estimate is a weighted average net of Brewster County.

Table 5
Implied Income Gains for Limited Post-High School Education

County	Per capita impact	Aggregate impact (in millions)
Brewster	Not calculated	Not calculated
Cameron	$ 959	$227.2
El Paso	100	54
Hidalgo	1,188	413.5
Hudspeth	916	2.5
Jeff Davis	72	0.1
Kinney	887	2.6
Maverick	1,631	53.7
Presidio	1,531	9.4
Starr	2,075	75.7
Terrell	615	0.8
Val Verde	687	24.2
Webb	873	104.5
Zapata	816	6.9
Border zone	$ 711	$975

NOTES: All impacts calculated in dollars for 1990 relative to the Texas average for increased high school completion and partial college attendance. Border zone estimate is a weighted average net of Brewster County. Some data may not match due to rounding.

Table 6
Implied Income Gains from Increased College Completion

County	Per capita impact	Aggregate impact (in millions)
Brewster	Not calculated	Not calculated
Cameron	$1,199	$ 284
El Paso	736	396.9
Hidalgo	1,271	442.4
Hudspeth	1,776	4.8
Jeff Davis	Not calculated	Not calculated
Kinney	1,343	3.9
Maverick	1,877	61.8
Presidio	1,227	7.5
Starr	1,964	71.7
Terrell	1,199	1.6
Val Verde	1,054	37.1
Webb	1,328	159.1
Zapata	1,935	16.3
Border zone	$1,086	$1,487

NOTES: All impacts calculated in dollars for 1990 graduation rates relative to the Texas average.
Border zone estimate is a weighted average net of Brewster and Jeff Davis Counties.

to $1,964 per resident in Starr County. The per capita average for the entire border zone is $1,086, which translates into a gross regional income improvement of nearly $1.5 billion.

Because data shown in Tables 4, 5, and 6 are calculated in 1990 dollars, they will understate current year income losses resulting from regional dropout patterns. Also, the implied costs of secondary school noncompletion may fall below their true level in 2001 as a consequence of changes in the state and national labor markets. Namely, service sector positions make up the majority of new jobs in Texas, and many of these jobs require education beyond a high school degree. Failure to graduate from high school is thus likely to impose a more severe financial penalty today than in 1990. This can be verified once 2000 census data for Texas counties are assembled and disseminated.

Another reason gross benefits may be understated is the secondary effect of educational enhancement. As more border county residents complete each education level, they raise the probability of eventually obtaining even more training. For instance, if secondary school dropout rates are brought down, that success will likely engender more college and technical school attendance. This effect is not taken into account in any of the simulations detailed above. It should be noted, however, that income is endogenous to education. As education levels rise, skilled labor should become less scarce and the returns to education might decline. The latter implies that the parameter estimates represent upper, not lower, bounds on the simulated impacts of increases in education. Also, as education increases, other income components, such as income maintenance and unemployment transfers, may fall.

Although the preceding arguments hold true for aggregate personal income, they do not represent all factors that should be considered from a social welfare perspective. Raising secondary and postsecondary graduation rates in border counties will require some type of public initiative. Comprehensive public administrative estimates would also require any specific policy prescription to be accompanied by cost–benefit calculations. As documented elsewhere, increases in education expenditures do not yield immediate gains (Sylwester 1999). Reliable cost–benefit estimates will vary with each border county and the individual policy steps taken. Such an effort falls beyond the scope of this research. It is probably safe to conclude, however, that the net present value of policy programs implemented to raise border area enrollment and graduation rates will exceed zero by comfortable margins (see Becker 1993).

CONCLUSION

Regional economic research in recent years has attempted to quantify the relationships between per capita incomes and a variety of socioeconomic factors. This study replicates those efforts for Texas, with particular emphasis on analyzing income performance in border counties. Given the rapid transition toward an information-oriented, increasingly competitive business environment, the links between human capital and economic progress are intensifying throughout the United States.

Empirical results detailed above are broadly consistent with studies for other regions of the national economy. Failure to complete high school leads to statistically significant negative impacts on per capita incomes in Texas. Increases in the number of retirees in a county improve personal income performance throughout the state. Residents of urban counties observe greater incomes in general than do residents of smaller counties. Geography and demography also become apparent in the statistically lower incomes of counties that lie in physical proximity to Mexico.

Model simulations underscore the importance of high school graduation for border counties. Reduction of the dropout rate to a level commensurate with the rest of the state would have potentially increased income per border resident by more than $2,600 in 1990.

Collectively, that figure implies nearly a $3.6 billion earnings loss for border county economies. Reestimation with data assembled from the 2000 census is likely to indicate an even larger premium associated with educational attainment. Comparison estimates using 1990 sample information may also be feasible for the border states of New Mexico, Arizona, and California.

From a public policy perspective, the implications of this research are fairly clear. Border counties, and other regions within the state, will benefit in a direct financial manner by reducing secondary school dropout rates. Border area income performance may also be enhanced by greater public infrastructure investment. Improved transportation and communication links with the rest of the state will help offset the income decline that is at least partially associated with geographic isolation and distance from other regional markets. The latter topics are the subjects of ongoing research at various organizations in Texas.

NOTES

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[1] Weighted least squares, logarithmic, and semilogarithmic versions of several equations were also estimated as additional means of circumventing residual variance nonconstancy. Results from these estimates were generally in line with those reported in Table 3. Detailed output is available from the author.

[2] Some alternative specifications using weighted least squares with population as the weighting factor generated *t* statistics for this regressor that exceeded the 5 percent criterion. Similar results also occurred for some specifications relying on semilogarithmic versions of the model. In none of these cases, however, were all the parameters simultaneously significant. These results are available from the author.

[3] Several alternative specifications using weighted least squares or logarithmic transformations obtained statistically significant coefficients with the hypothesized signs for some or all of the language coefficients. In no individual case, however, were statistically significant parameters obtained for all explanatory variables. Results are available from the author.

[4] Additional equation versions, including the percentage of foreign-born individuals as a proxy for English language skills, also failed to render empirically superior estimates to those shown in Table 3. Detailed output is available from the author.

[5] An additional set of regressions was estimated to examine the impact of female labor force participation in Texas counties. Increases in female labor force participation rates appear to be correlated with positive impacts on county per capita incomes, but the various coefficient estimates fall just short of the 5 percent significance threshold in most instances. Border zone labor force participation tends to lag the nation as a whole (Donnelly 2000), but improved graduation rates would raise the value of female labor market participation (Becker 1993). Consequently, demographic convergence with other regions of the country may eventually help increase border incomes also.

[6] Several equations were also estimated using a second dummy variable for smaller metropolitan counties. Similar to the Missouri results discussed in Domazlicky et al. (1996) these coefficients were positive and smaller but not statistically significant. These results are also available from the author.

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