Chronically-Distressed Metropolitan Area Economies

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In prior work (Hill et. al., 2012), we examined the ability of regional economies to bounce back after experiencing an exogenous economic shock. In this paper, we build on our earlier work to examine a different type of region: metropolitan areas that have endured chronic low levels of growth over a long period of time. These chronically-distressed regions (or slow-burning regions, as some have termed them) may require a different set of responses than regions that experience external shocks over a period of only a few years.

We conceptualize a chronically-distressed region as one whose rate of growth is slow relative to the national economy over an extended number of years. Our data consist of total employment from 1970 through 2007 and gross metropolitan product (GMP) from 1978-2007 for 361 metropolitan statistical areas in the United States. We concern ourselves with the following questions: What factors contribute to a region becoming chronically-distressed? What distinguishes those regions that are able to recover from chronic low-growth from those that are not? For those regions that do recover, what accounts for the duration of their recovery? To answer these questions, we employ a series of cross-sectional and longitudinal models.

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I. Introduction

In earlier work (Hill et. al , 2012), we examined the ability of regions to maintain or return to an equilibrium state in the presence of an exogenous shock. In this paper, we examine a different type of region: metropolitan areas that have endured chronic low levels of growth. We conceptualize a chronically-distressed region as one whose rate of growth is slow relative to the national economy over a longer period of time. These so-called chronically-distressed regions may require a different set of responses than regions that experience external shocks over a period of only a few years.

Although there is an extensive literature devoted to regional economic development policy, most of the research in this area does not distinguish between different growth patterns of metropolitan areas. As a result, it is sometimes unclear whether theory and recommendations that are relevant for metropolitan statistical areas (MSAs) that have suffered from a singular economic shock that has a short-term impact are also relevant for MSAs that have experienced or are experiencing chronic low levels of growth. This is not to suggest that the explanations for metropolitan economic growth and decline discussed in earlier work are irrelevant to MSAs that suffer from long-term decline. Rather, the particular stresses affecting this group of regions have not been sufficiently explored. In this paper, we attempt to understand the ways in which chronically-distressed regions differ from regions that experience short-term exogenous shocks and to what extent our earlier findings remain valid.

This paper proceeds as follows. In section II we briefly summarize research that touches specifically on chronically-distressed regions. Section III then provides definitions and descriptive statistics that outline the scope of the problem and the number of regions meeting our definition of chronically-distressed. Section IV provides the same set of statistics, except that it uses data on gross metropolitan product (GMP) rather than employment. Section V estimates a number of econometric models aimed at understanding why regions become chronically-distressed as well as how they may recover. Section VI concludes.

II. Research on Chronically-Distressed Regions

The international development literature has been the most clear in delineating patterns of economic growth. Pritchett (2000) describes patterns of growth in developing countries, many of which do not follow the relatively stable growth pattern of the United States. He distinguishes between countries that experience steady growth from those that experience rapid growth followed by stagnation (plateaus) and those that experience continuous stagnation (plains).

Pack (2002), building off a report from the U.S. Department of Housing and Urban Development, identifies highly distressed metropolitan areas as those in which poverty rates, unemployment rates, and per capita income were at least one-half standard deviation worse than the national average. By these criteria, she identifies 31 regions, the majority of which are in the South. In fact, she concludes that distressed regions are much more regionally concentrated than well-off metropolitan areas. She also identifies vast differences in educational attainment and technology (measured by the presence of universities highly ranked in the sciences) between distressed regions and the rest of the country.

Wial, Friedhoff, and Wolman (2010) chronicle the decline of metropolitan areas that strongly specialized in manufacturing in 1980, suggesting that industrial composition was a strong predictor of chronic distress over the period of their study (1980 – 2005). Two-thirds of the 114 industrial metropolitan areas in their sample, mostly in the Midwest, underperformed relative to the rest of the nation in both job growth and average wage growth. Areas that lost the most manufacturing jobs were also the least successful at realizing employment gains in non-manufacturing and advanced service jobs.

Other researchers, while not proposing a typology or set of policy solutions of their own, note how poorly current economic development theory applies to those regions who are worst-off. Glasmeier (2000) writes, "Very few [economic development policies] are designed to confront structural problems of enduring importance. Although reducing poverty and uneven development and providing jobs for disadvantaged citizens are often invoked as the rationale behind development policies, in fact these policies are not designed to reconcile problems of deep poverty and economic abandonment… Conventional policy has yet to find the key that unlocks the fate of truly troubled locales" (568). Glasmeier makes particular note of the failures of agglomeration theory: "It has been recognized (but largely ignored) that cluster/complex models of development only apply to locations where a substantial accumulation of economic activity already exists… We may wish cluster development to be, but it only occurs where there are sufficient levels of economic activity to support the creation of new markets and to warrant the formation of industrial linkages" (567). Armstrong and Taylor (2000) stress the extent to which regional disparities in unemployment that persist for long periods of time can have harmful effects on the national economy and suggest that regional policy in Britain has failed in part because policymakers have not specified objectives clearly enough.

Research that does attempt to explain why and how certain regions stagnate often point to variables that are similar to those cited in work in long-term economic growth: human and physical capital. Glaesar (2009) points to a low skill level as the most powerful reason why some metropolitan areas have experienced continuing spirals of decline. Released in the boom years of the late 1990's, the U.S. Department of Housing and Urban Development's 1999 report, "Now is the Time: Places Left Behind in the New Economy," focused on central cities that were being left behind by the nation's recent growth period. Most of the cities they identified were smaller communities, though some were larger central cities with persistent inequality. The report's main purpose was to point out that certain rural communities were isolated from the investment capital that cities are more successful at attracting and from the diversity of institutions and networks that can mobilize responses to the complex problems of chronic poverty and joblessness. The policy responses they advocated for included Empowerment Zones and affordable housing vouchers.

Glaesar and Gyourko (2005) suggest that housing may play a role in the continued decline of certain urban areas, explaining that the durability of housing is a main reason why urban decline tends to be highly persistent and lengthy. They also make note of the fact that declining cities disproportionately attract those with low levels of human capital through lower housing costs, which may further deter growth.

III. Definitions and Descriptive Statistics - Employment

We conceptualize a chronically-distressed region as one whose rate of growth is slow relative to the national economy over a long period of time. For the sake of this paper, we define a chronically-distressed region as follows. In a given year, a region is growing slowly if its growth rate over the previous eight years (defined, as in previous work, as the slope of the regression line of the natural logarithm of employment – or GMP – on a time trend) is less than 50% of the national eight-year growth rate and at least one percentage point less than the national growth rate. A region (which we continue to define here as a metropolitan area) is chronically-distressed if it meets this criteria for seven consecutive years; that it, its eight-year growth rate is less than 50% of the national eight-year growth rate and at least one percentage point less than the national growth rate for seven consecutive years.

Table 1 provides a list of regions who meet this definition of chronically-distressed based on their employment growth (In the following section, we examine GMP). A total of 108 metropolitan areas meet the minimum criteria, though this number includes some double-counting; a few metropolitan areas see more than one sustained period of slow growth and thus are counted twice. Of the 108 periods of slow growth, there are 89 unique metropolitan areas. This represents 25% of the 361 metropolitan areas in our sample.

Table 1 includes some entries that are predictable and others that are perhaps more surprising. For instance, the Boston area remains a hub of universities, hospitals, and technology, and yet the MSA suffered from seven consecutive years of slow growth in the late 1980s and early 1990s. However, the slow growth in total employment is due to broader industrial shifts that helped the area shed non-durable manufacturing jobs and gain higher wage jobs in technology and healthcare (Bluestone & Stevenson, 2010). On the other hand, Table 1 also includes places like Youngstown, OH, which has been chronicled by Safford (2009) as an example of post-industrial decline, with high unemployment and low wages into the 2000s.

Table 1: List of chronically-distressed regions (Employment)

Number of Consecutive Years of Slow Growth	Number of MSAs That Meet the Criteria	MSAs
7	24	Allentown-Bethlehem-Easton, PA-NJ Boston-Cambridge-Quincy, MA-NH Bridgeport-Stamford-Norwalk, CT Chicago-Naperville-Joliet, IL-IN-WI Corpus Christi, TX Dubuque, IA Hickory-Lenoir-Morganton, NC Houma-Bayou Cane-Thibodaux, LA Johnstown, PA Los Angeles-Long Beach – Santa Ana, CA Midland, TX New Orleans-Metairie-Kenner, LA Parkersburg-Marietta, WV-OH Peoria, IL Pine Bluff, AR Poughkeepsie-Newburgh-Middletown, NY Rochester, NY Saginaw-Saginaw Township North, MI Sandusky, OH Shreveport-Bossier City, LA Utica-Rome, NY (2 times) Vineland-Millville-Bridgeton, NJ Williamsport, PA
8	29	Abilene, TX Bangor, ME Beaumont-Port Arthur, TX Cleveland-Elyria-Mentor, OH Columbus, IN Danville, VA Davenport-Moline-Rock Island, IA-IL Duluth, MN-WI El Centro, CA Florence-Muscle Shoals, AL Great Falls MT Honolulu, HI Huntington-Ashland, WV-KY-OH Kingston, NY Kokomo, IN (2 times) Muskegon-Norton Shores, MI New Haven-Milford, CT New York-Northern NJ -Long Island, NY-NJ-PA Odessa, TX Providence-New Bedford-Fall River, RI-MA Pueblo, CO Sioux City, IA-NE-SD Springfield, MA Syracuse, NY Terre Haute, IN Weirton-Steubenville, WV-OH Wichita Falls, TX

		York-Hanover, PA
9	24	Battle Creek, MI Bay City, MI Buffalo-Niagara Falls, NY Canton-Massillon, OH Charleston, WV Cumberland, MD-WV Dayton, OH Flint, MI Jackson, MI Mansfield, OH (2 times) Michigan City-La Porte, IN (2 times) Muncie, IN Pittsburgh, PA Pittsfield, MA Pocatello, ID Rocky Mount, NC Scranton--Wilkes-Barre, PA Springfield, MA Terre Haute, IN Waterloo-Cedar Falls, IA Williamsport, PA Youngstown-Warren-Boardman, OH-PA
10	11	Anderson, IN Buffalo-Niagara Falls, NY Casper, WY Danville, VA Elmira, NY Erie, PA Hartford-West Hartford-East Hartford, CT Kankakee-Bradley, IL Niles-Benton Harbor, MI Springfield, IL Springfield, OH
11	8	Akron, OH Altoona, PA Anniston-Oxford, AL Muncie, IN Niles-Benton Harbor, MI Pascagoula, MS Pittsfield, MA Vineland-Millville-Bridgeton, NJ
12	6	Binghamton, NY Decatur, IL Flint, MI Lebanon, PA Springfield, OH Youngstown- Warren-Boardman, OH-PA
13	2	Johnstown, PA Wheeling, WV-OH
15	1	Weirton-Steubenville, WV-OH
16	2	Anderson, IN Lawton, OK
29	1	Danville, IL

Just as we distinguished between resilient and non-resilient regions in our earlier work, here we distinguish between chronically-distressed regions that never see any period of recovery and those chronically-distressed regions that do recover from chronic low-growth. We define recovery in this context as when a formerly chronically-distressed region sees its eight-year growth-rate reach 75% or within 0.5 percentage points of the nation's eight-year growth rate and remain at that level for a period of seven consecutive years. Table 2 provides a list of chronically-distressed regions that show recovery. A total of 42 (47%) of the 89 metro areas that are chronically-distressed see a period of recovery within the timeframe of our dataset. It is important to note that regions that experience slow-growth near the tail end of our dataset will be unable to see recovery within the time frame of study.[1] Table 3 provides a list of chronically-distressed regions that did not show recovery.

Once again, the lists only tell part of the story. The Boston metropolitan area is included in Table 3 as a region that did not recover from chronic slow-growth. However, the region did show six consecutive years of recovery before experiencing a slight downturn in the 2000s, thereby preventing it from meeting the criteria for recovery. Youngstown-Warren-Boardman, on the other hand, experienced another period of slow-growth almost immediately after its first episode and therefore is not included on either of the lists because it was still experiencing slow-growth. (As the table notes, it does not include regions still experiencing chronic slow-growth as of 2001.)

Table 4 highlights the fact that there are considerable regional differences in terms of the number of chronically-distressed regions as well as the percentage of chronically-distressed regions that showed recovery. Unlike Pack, who found that the majority of chronically-

[1] We account for this in our longitudinal regressions by removing 2002-2007 as years of observation.

Table 2: List of regions that recovered from chronic slow-growth (Employment)

Last Year of Consecutive Slow Growth Before Recovery	MSA
1988	Akron, OH
1988	Allentown-Bethlehem-Easton, PA-NJ
1988	Altoona, PA
1998	Bangor, ME
1988	Battle Creek, MI
1989	Bay City, MI
1989	Canton-Massillon, OH
1994	Casper, WY
1991	Charleston, WV
1987	Chicago-Naperville-Joliet, IL-IN-WI
1988	Columbus, IN
1993	Corpus Christi, TX
1989	Davenport-Moline-Rock Island, IA-IL
1988	Dubuque, IA
1989	Duluth, MN-WI
1989	El Centro, CA
1989	Erie, PA
1992	Houma-Bayou Cane-Thibodaux, LA
1989	Huntington-Ashland, WV-KY-OH
1988	Jackson, MI
1989	Kankakee-Bradley, IL
1999	Los Angeles-Long Beach-Santa Ana, CA
1988	Michigan City-La Porte, IN
1994	Midland, TX
1988	Muncie, IN
1987	Muskegon-Norton Shores, MI
1998	New York-Northern New Jersey-Long Island, NY-NJ-PA
1993	Odessa, TX
1990	Parkersburg-Marietta, WV-OH
1990	Pascagoula, MS
1988	Peoria, IL
1991	Pocatello, ID
1999	Poughkeepsie-Newburgh-Middletown, NY
1989	Pueblo, CO
1987	Sandusky, OH
1986	Scranton--Wilkes-Barre, PA
1993	Shreveport-Bossier City, LA
1987	Sioux City, IA-NE-SD
1998	Springfield, MA
1989	Terre Haute, IN
1990	Waterloo-Cedar Falls, IA
1993	Wichita Falls, TX

Table 3: List of regions that did not recover from chronic slow growth (Employment)

(Does not include regions still enduring chronic slow-growth as of 2001)

Last Year of Consecutive Slow-Growth	MSA
1994	Abilene, TX
1987	Anderson, IN
1991	Beaumont-Port Arthur, TX
1997	Boston-Cambridge-Quincy, MA-NH
1997	Bridgeport-Stamford-Norwalk, CT
1987	Buffalo-Niagara Falls, NY
1988	Cleveland-Elyria-Mentor, OH
1990	Cumberland, MD-WV
1991	Danville, VA
1990	Decatur, IL
1987	Elmira, NY
1994	Flint, MI
1990	Great Falls, MT
1990	Johnstown, PA
1999	Kingston, NY
1987	Kokomo, IN
1989	Lebanon, PA
1986	Mansfield, OH
1998	New Haven-Milford, CT
1992	New Orleans-Metairie-Kenner, LA
1987	Niles-Benton Harbor, MI
1990	Pittsburgh, PA
1998	Pittsfield, MA
1998	Providence-New Bedford-Fall River, RI-MA
1987	Springfield, OH
1984	Utica-Rome, NY
2000	Vineland-Millville-Bridgeton, NJ
1992	Weirton-Steubenville, WV-OH
1992	Wheeling, WV-OH
1987	Williamsport, PA
1995	York-Hanover, PA
1989	Youngstown-Warren-Boardman, OH-PA

Table 4: Regional Differences

Region	Number of Metros in Each Region	Number of Chronically-Distressed Metros	Percent of Metros that are Chronically-Distressed	Number of Chronically-Distressed Metros that Recovered	Percentage of Chronically Distressed Metros that Recovered
Northeast	45	27	60%	8	30%
Midwest	90	33	37%	19	58%
South	147	22	15%	10	45%
West	79	7	9%	5	71%

distressed regions were in the South at the time of her writing, our criteria suggests that a large number are in the Northeast and Midwest; in fact, over half of the metropolitan regions in our sample falling in the Northeast meet the criteria for being chronically-distressed. This is substantially higher than any other region, with the Midwest being the second most affected at 37 percent. The Midwest has the largest *number* of chronically-distressed regions, with 33.

We provide descriptive statistics in Tables 5 and 6 that highlight some of the differences between both chronically-distressed metropolitan areas and all other metros, as well as differences between chronically distressed metropolitan areas that showed recovery and chronically-distressed regions that did not show recovery. The most striking take-away from Table 5 is that there appear to be considerable differences between chronically-distressed regions and healthy regions in a number of key categories. Chronically-distressed regions appear to have a higher percent of employment in manufacturing (16.2 percent vs 12.7 percent) and a less-educated population (53.9 percent of the adult population with a high school education or less vs. 47.4 percent).

In contrast to Table 5, Table 6 finds few statistically significant differences between chronically-distressed regions that recovered and those that did not. In fact, the only variable that attains statistical significance at the 5 percent level is the percent of the population that was Hispanic in 2000. Chronically-distressed regions that recovered had a Hispanic population (10.07 percent of the total) that was much larger as a percentage than regions that did not recover (3.99 percent). As with many of the variables, it is difficult to infer the direction of causality; it may be the case that growing regions attract a greater number of immigrants.

Table 5: Chronically-distressed metros vs. all other metros

	Chronically-Distressed Metros	All Other Metros	Difference
Percent Employment in Manufacturing (2000)	16.2	12.7	3.4***
Number of Export Industries (2000)	5.49	4.84	0.66**
Percent of Population 25+ with a High School Education or Less (2000)	53.9	47.4	6.5***
Percent Hispanic (2000)	6.86	10.1	-3.3*
Average July Temperature	74.8	76.3	-1.5**
Right to Work State (2000)	0.24	0.53	-0.29***
Herfindahl Index	4.71	4.06	0.65**
Number of research institutions	0.61	0.47	0.13
Distance to large metro	189	185	5
Population (2000) -- Medians	163,706	238,314	-74,608**

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6: Chronically-distressed regions that showed recovery vs. chronically-distressed regions that did not recover

	Chronically-Distressed Metros that DID Recover	Chronically-Distressed Metros that DID NOT Recover	Difference
Percent Employment in Manufacturing (2000)	15.0	17.2	-2.14
Number of Export Industries (2000)	5.40	5.57	-0.17
Percent of Population 25+ with a High School Education or Less (2000)	53.3	54.4	-1.11
Percent Hispanic (2000)	10.07	3.99	6.09**
Average July Temperature	75.24	74.43	0.81
Right to Work State (2000)	0.29	0.19	.09
Herfindahl Index	4.16	3.98	0.18
Number of research institutions	0.69	0.53	0.16
Distance to large metro	181	197	-16
Population (2000) -- Medians	164,624	162,453	2171

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

IV. GMP Statistics

In this section, we apply the same definitions as above, only we use GMP data rather than employment data. Table 7 lists those regions that meet the definition of chronically-distressed according to the trend in their gross metropolitan project.

There are 102 periods of slow growth, including 90 unique metro areas or 25% of our sample. This number is almost identical to the number of metros that meet the definition of chronically-distressed based on their employment growth. Of these 90, however, only 11 demonstrated recovery from chronic distress within the time frame of study. This may be attributed in part to the fact that our GMP data is more limited, consisting only of 22 years (1986-2007) in which a region could show decline and recovery. Table 8 and 9 list those regions that recovered and did not recover respectively from chronic distress. Among those regions that are absent from Table 8 include many of the highly populated regions from Table 1, including Boston, Los Angeles, and New York. On the other hand, many of the smaller, formerly industrial regions have remained, including Youngstown.

Tables 10, 11, and 12 provide further descriptive statistics. Table 10 shows that once again the Northeast contains the highest percentage of metros that are chronically distressed, and the West the least, those the disparities are not as stark as they are in the employment data. Whereas 60 percent of regions in the Northeast are chronically-distressed according to Table 4, Table 10 reveals this percentage to be 38 percent.

Unlike Table 5, Table 11 does not reveal a disparity between chronically-distressed regions and all other metros in terms of manufacturing employment. This is consistent with manufacturing providing a large number of relatively low-wage jobs. However, Table 11 is consistent with Table 5 in that it finds chronically-distressed metros to have more export industries and a less-educated population. Table 11 also reveals what many researchers have often claimed: access to human capital, in the form of research university and proximity to large metro areas, is beneficial and may forestall decline; according to Table 11, chronically-distressed regions have fewer research institutions and are farther from other large metro areas.

Whereas Table 6 did not reveal many statistically significant differences between metros that recovered from chronic-distress and those that did not, Table 12 is more revealing. When looking at GMP data, metros are more like to recover if they have less employment in manufacturing, a higher average temperature (correlated with region of the country), and find themselves in a state with right-to-work laws.

Table 7: List of chronically-distressed regions (GMP)

Number of Consecutive Years of Slow Growth	Number of MSAs That Meet the Criteria	MSAs
7	29	Albany, GA Bangor, ME Baton Rouge, LA Bay City, MI Beaumont-Port Arthur, TX Canton-Massillon, OH Corpus Christi, TX Elmira, NY Farmington, NM Grand Forks, ND-MN Great Falls, MT Huntington-Ashland, WV-KY-OH Ithaca, NY Jackson, MI Kalamazoo-Portage, MI Kankakee-Portage, MI Kokomo, IN Lebanon, PA Lewiston, ID-WA Lubbock, TX Owensboro, KY Pascagoula, MS Poughkeepsie-Newburgh-Middletown, NY Saginaw-Saginaw Township North, MI San Angelo, TX Sandusky, OH Terre Haute, IN Tulsa, OK Victoria, TX
8	25	Amarillo, TX Bay City, MI Billings, MT Bismarck, ND Canton-Massillon, OH Charleston, WV Danville, VA Davenport-Moline-Rock Island, IA-IL Erie, PA Florence-Muscle Shoals, AL Grand Forks, ND-MN Kingsport-Bristol-Bristol, TN-VA Lafayette, LA Lake Charles, LA Mansfield, OH Muncie, IN Niles-Benton Harbor, MI Oklahoma City, OK Owensboro, KY Parkersburg-Marietta, WV-OH (2 times)

		Pittsfield, MA Pocatello, ID St. Joseph, MO-KS Vineland-Millville-Bridgeton, NJ Youngstown-Warren-Boardman, OH-PA
9	11	Atlantic City, NJ Battle Creek, MI Flint, MI (2 times) Gadsden, AL Great Falls, MT Honolulu, HI Kingston, NY Longview, TX Monroe, LA Utica-Rome, NY Youngstown-Warren-Boardman, OH-PA
10	10	Abilene, TX Alexandria, LA Glens Falls, NY Houma-Bayou Cane-Thibodaux, LA Huntington-Ashland, WV-KY-OH Longview, WA Mansfield, OH Saginaw-Saginaw Township North, MI Sherman-Denison, TX Shreveport-Bossier City, LA
11	4	Gadsden, AL Lima, OH Muskegon-Norton Shores, MI Wichita Falls, TX
12	4	Decatur, IL Fairbanks, AK New Orleans-Metairie-Kenner, LA Odessa, TX
13	2	Johnstown, PA Syracuse, NY
14	4	Binghamton, NY Casper, WY Rochester, NY Williamsport, PA
15	3	Anchorage, AK Anniston-Oxford, AL Cheyenne, WY
16	2	Lawton, OK Midland, TX
17	2	Anderson, IN Cumberland, MD-WV
19	1	Wheeling, WV-OH
22	3	Danville, IL Pine Bluff, AR Weirton-Steubenville, WV-OH

Table 8: List of regions that recovered from chronic slow-growth (GMP)

Last Year of Consecutive Slow Growth Before Recovery	MSA
1997	Alexandria, LA
1993	Baton Rouge, LA
1999	Casper, WY
1992	Farmington, NM
1995	Houma-Bayou Cane-Thibodaux, LA
1994	Lafayette, LA
1993	Lake Charles, LA
1995	Longview, TX
1994	Oklahoma City, OK
1993	Pocatello, ID
1993	Tulsa, OK

Table 9: List of regions that did not recover from chronic slow growth (GMP)

(Does not include regions still enduring chronic slow-growth as of 2001)

Last Year of Consecutive Slow-Growth	MSA
1996	Abilene, TX
1994	Amarillo, TX
2000	Bangor, ME
1993	Bay City, MI
1992	Beaumont-Port Arthur, TX
1993	Billings, MT
1993	Bismarck, ND
1993	Canton-Massillon, OH
1993	Charleston, WV
1992	Corpus Christi, TX
1993	Davenport-Moline-Rock Island, IA-IL
1997	Decatur, IL
1998	Fairbanks, AK
1994	Flint, MI
1996	Gadsden, AL
1993	Grand Forks, ND
1992	Great Falls, MT
1992	Huntington-Ashland, WV-KY-OH
1999	Ithaca, NY
1992	Jackson, MI
2000	Lebanon, PA
1992	Lubbock, TX
1998	Mansfield, OH
1995	Monroe, LA
1996	Muskegon-Norton Shores, MI
1998	New Orleans-Metairie-Kenner, LA
1997	Odessa, TX

1993	Owensboro, KY
1993	Parkersburg-Marietta, WV-OH
1999	Pittsfield, MA
2000	Poughkeepsie-Newburgh-Middletown, NY
1995	Saginaw-Saginaw Township North, MI
1993	San Angelo, TX
1996	Sherman-Denison, TX
1996	Shreveport-Bossier City, LA
1993	St. Joseph, MO-KS
1992	Terre Haute, IN
1992	Victoria, TX
1996	Wichita Falls, TX
1993	Youngstown-Warren-Boardman, OH-PA

Table 10: Regional Differences (GMP)

Region	Number of Metros in Each Region	Number of Chronically-Distressed Metros	Percent of Metros that are Chronically-Distressed	Number of Chronically-Distressed Metros that Recovered	Percentage of Chronically Distressed Metros that Recovered
Northeast	45	17	38%	0	0
Midwest	90	25	28%	0	0
South	147	37	25%	8	22%
West	79	11	14%	3	27%

Table 11: Chronically-distressed metros vs. all other metros (GMP)

	Chronically-Distressed Metros	All Other Metros	Difference
Percent Employment in Manufacturing (2000)	14.3	13.3	0.98
Number of Export Industries (2000)	7.77	6.42	1.3***
Percent of Population 25+ with a High School Education or Less (2000)	53.2	47.6	5.6***
Percent Hispanic (2000)	6.04	10.4	-4.4**
Average July Temperature	75.4	76.2	-0.78
Right to Work State (2000)	0.37	0.48	-0.10*
Herfindahl Index	4.29	4.64	-0.35
Number of research institutions	0.19	0.61	-0.42***
Distance to large metro	283	153	130***
Population (2000) -- Medians	146438	273170	-126,732***

* p < 0.10, ** p < 0.05, *** p < 0.01

Table 12: Chronically-distressed regions that showed recovery vs. chronically-distressed regions that did not recover (GMP)

	Chronically-Distressed Metros that DID Recover	Chronically-Distressed Metros that DID NOT Recover	Difference
Percent Employment in Manufacturing (2000)	8.89	15.1	-6.2***
Number of Export Industries (2000)	6.90	7.89	-0.98
Percent of Population 25+ with a High School Education or Less (2000)	52.5	53.3	-0.82
Percent Hispanic (2000)	4.80	6.22	-1.4
Average July Temperature	79.5	74.8	4.8***
Right to Work State (2000)	0.73	0.33	0.40**
Herfindahl Index	4.19	4.30	0.11
Number of research institutions	0.36	0.16	0.20
Distance to large metro	247	289	-41
Population (2000) -- Medians	194,042	142,950	51,092*

* p < 0.10, ** p < 0.05, *** p < 0.01

V. Empirical Models

In this section, we move beyond descriptive statistics and employ regression analysis to better understand those factors that are associated with regions falling victim to chronic distress and the ability to recover from such a state. Our data consist of total employment from 1970 through 2007 and gross metropolitan product (GMP) from 1978-2007 for 361 metropolitan statistical areas in the United States. We use the 2003 Office of Management and Budget definitions of metropolitan areas, and we aggregate data from the county-level to ensure that our metropolitan-level data are consistent across changing metro boundaries.

We concern ourselves with the following questions: What factors contribute to a region becoming chronically-distressed? What distinguishes those regions that are able to recover from chronic low-growth from those that are not? For those regions that do recover, what accounts for the duration of their recovery? To answer these questions, we employ a series of cross-sectional and longitudinal models.

Model #1: What factors are associated with a region becoming chronically-distressed?

To address this question, we employ a cross-sectional logit model that uses covariate data from the year 2000. The dependent variable equals 1 in the case that a region is chronically-distressed at any point in our time frame of study (1978-2007) and 0 otherwise.

Model #2: What factors contribute to a region becoming chronically-distressed if it is not already?

This model asks a similar question to model 1 except that it makes use of the full longitudinal nature of our data. The dependent variable in the case equals 1 one in the first year that a region begins to undergo chronic low-growth. As a result, the model only includes observations up to that point in time. We employ a hazard model that examines the factors that contribute to a region becoming chronically-distressed (if at all). A hazard model is a model that measures the amount of a time that an entity spends in a steady state before experiencing a particular event. In this case, we use the Cox proportional hazards model, which Box-Steffensmeier and Jones (2004) argue is preferable to parametric alternatives due to its less strict assumptions about the data-generating process.

Model #3: What distinguishes those regions that are able to recover from chronic low-growth from those that are not?

Once again we employ a cross-sectional logit model using data from the year 2000. In this case, we seek to distinguish regions that recovered from chronic low-growth from those that did not. Hence, we limit our sample to those regions that experienced chronic low-growth, substantially reducing our number of observations. The dependent variable in this case is a 1 in the case that a region recovered, and 0 otherwise.

Model #4: For those regions that did recover, what accounts for the duration of their recovery?

To further probe the factors that contribute to a region's recovery from chronic low-growth, we employ a hazard model similar to model #2 that attempts to explain how long it takes for a region to recover. The dependent variable is a 1 in the first year of a region's recovery, and 0 otherwise.

Table 7 presents summary statistics for the economic and demographic variables we include in our models. (Table 8 presents summary statistics for our GMP data.) We selected variables based on our prior findings on regional economic development (Hill et. al, 2012) as well as the literature review presented earlier in this paper. To capture different regions' level of human capital / skill base, we include the percent of the population with a high school education or less. Industrial structure is captured by three variables reflecting the percentage of employment in manufacturing, health care, and tourism-related industries, respectively. Economic diversification is captured by a Herfindahl index, as well as by the number of export industries.[2] The distance to a large metro area reflects the strength of industrial linkages and access to capital. According to the urban hierarchy literature, the markets for certain goods will tend to cluster in larger central places in order to take advantage of economies of agglomeration, while "first-order places" – those that are smaller and more isolated – will contain fewer services and fewer types of firms (Heilbrun, 1987). Demographic variables include the percentage of the population that is non-Hispanic black, the percentage of the population that is Hispanic, and the 80-20 income ratio. (See Hill et al (2012) for a more extended discussion of the variables included in the models.)

[2] As in our prior work, we define a three-digit NAICS industry as a major export industry in a region if its share of regional employment is at least 1.0 percent and is at least 80 percent above the same industry's share of national employment.

Table 7: Summary Statistics, Employment (1978-2007)

Variable	Source	Mean	Min	Max
Percent of population with high school education or less	Census /DataFerrett/GeoLytics	58	22	83
Lagged employment (Thousands of Jobs)	Economy.com	271	5	8532
Wages per Worker (Thousands of 2005 $)	Economy.com/Own Calculations	31	18	87
Percent of employment in the following categories:				
- Manufacturing (NAICS 31,32, 33)	Economy.com/Own Calculations	15	1	55
- Health Care and Social Assistance (62)	Economy.com/Own Calculations	9	1	36
- Tourism-Related Industries (Arts, Entertainment, Recreation, Accommodation, and Food-Services) (71-72)	Economy.com/Own Calculations	9	3	41
Number of major export industries	Economy.com/Own Calculations	5	0	15
Herfindahl index	Economy.com/Own Calculations	5	2	42
Northeast	Census	0.12	0	1
Midwest	Census	0.25	0	1
South	Census	0.41	0	1
West	Census	0.22	0	1
Number of research institutions (Universities classified by the Carnegie Foundation as involved in either high or very high research activity)	Carnegie Foundation	0.51	0	13
Right-to-work state	National Right to Work Legal Defense Foundation	0.43	0	1
Percent of population Non-Hispanic Black	Census /DataFerrett/GeoLytics	10	0	48
Percent of population Hispanic	Census /DataFerrett/GeoLytics	7	0	94
Income Ratio 80-20 (Times 10)	Census /DataFerrett/GeoLytics	42	30	79
Distance in hundreds of miles to large metropolitan area (with a population of 1 million or more)	Census/GIS	1.8	0	24

Table 8: Summary Statistics, GMP (1986-2007)

Variable	Source	Mean	Min	Max
Percent of population with high school education or less	Census /DataFerrett/GeoLytics	52	22	76
Lagged GMP (Millions of 2005 $)	Economy.com	23	0.5	1110
Wages per Worker (Thousands of 2005 $)	Economy.com/Own Calculations	32	20	87
Percent of employment in the following categories:				
- Manufacturing (NAICS 31,32, 33)	Economy.com/Own Calculations	14	1.0	51
- Health Care and Social Assistance (62)	Economy.com/Own Calculations	10	2	36
- Tourism-Related Industries (Arts, Entertainment, Recreation, Accommodation, and Food-Services) (71-72)	Economy.com/Own Calculations	9	3	41
Number of major export industries	Economy.com/Own Calculations	6	0	16
Herfindahl index	Economy.com/Own Calculations	5	2	38
Northeast	Census	0.12	0	1
Midwest	Census	0.25	0	1
South	Census	0.41	0	1
West	Census	0.22	0	1
Number of research institutions (Universities classified by the Carnegie Foundation as involved in either high or very high research activity)	Carnegie Foundation	0.51	0	13
Right-to-work state	National Right to Work Legal Defense Foundation	0.44	0	1
Percent of population Non-Hispanic Black	Census /DataFerrett/GeoLytics	10	0	48
Percent of population Hispanic	Census /DataFerrett/GeoLytics	8	0	94
Income Ratio 80-20 (Times 10)	Census /DataFerrett/GeoLytics	42	29	80
Distance in hundreds of miles to large metropolitan area (with a population of 1 million or more)	Census/GIS	1.8	0	24

VI. Results

Model #1: What factors are associated with a region becoming chronically-distressed?

Table 10 presents the results of Model #1 for employment. Two variables are statistically significant at the 1 percent level: the percentage of the adult (25+) population with a high school degree or less, and the 80-20 income ratio. As the coefficients in the regression model represent marginal effects, they can be interpreted as follows: a one percentage point increase in the percent of the adult population with a high school degree or less increases the probability that a region will experience chronic distress by 1.9 percentage points, given that all other covariates are at their mean. A one unit increase in the 80-20 income ratio (in this case, one unit equals a tenth of a percentage point) increases the probability of a region experiencing chronic distress by 1.6 percentage points, given that all other covariates are at their mean. The coefficients on the distance to a large metro area and on the percent of employment in health care and social assistance are also statistically significant at the 10 percent level; regions that are more isolated from other large metro areas and with a higher degree of employment in health care may be more likely to experience chronic low growth. These findings are largely supported by Table 14, which presents the results of the same regression for the GMP data. Education level, income ratio, and distance to a large metro remain statistically significant and positive (though not the percent of employment in health care).

The finding on the education variable is not surprising, as much of the growth literature has stressed the importance of human capital. Similarly, the correlation between chronic low growth and distance from another large metro area is consistent with Glasmeier's argument that industrial linkages are necessary in order for economic activity to accumulate. The finding for income inequality is perhaps more surprising, particularly in the GMP data. A high degree of wealth concentration may be indicative of growth in industries that favor highly skilled workers, growth that would not necessarily show up in overall employment gains but should be apparent in GMP data. However, this result has been documented by other researchers as well (Pastor & Benner, 2008; Morrow, 2008), who contend that inequality has its own economic costs, including social unrest and political fragmentation.

<u>Model #2: What factors contribute to a region becoming chronically-distressed in a given year if it is not already?</u>

In addition to educational attainment and income inequality, two new variables attain statistical significance in our second model: wages per worker and the percent of the population employed in tourism-related industries. The coefficients in this case are hazard ratios, the ratio between the predicted risk for a unit difference in the explanatory variable. In this case, the hazard or event of interest is the onset of chronic-distress. A hazard ratio of one indicates that the explanatory variable has no effect on the probability of the region becoming chronically-distressed in a given year. A hazard ratio of two indicates that a one unit increase in the explanatory variable doubles the risk of the region becoming chronically-distressed.

According to Table 10, a one unit increase in the wages per worker increases the risk of experiencing chronic distress by 18 percentage points. A one unit increase in the percent of employment that falls under tourism-related industries reduces the risk of chronic distress by approximately 8 percentage points (1.00 – 0.917).

Table 15 presents the GMP results and sees statistically significant hazard ratios that show a negative relationship (hazard ratios less than 1.0) between chronic distress and the following: the percent of employment in health care (positive in the first employment regression), the dummy variable indicating that a region is in a right-to-work state, as well as the percent of the population that is Hispanic. We interpret the right-to-work variable as a proxy for labor market flexibility; hence, this finding need not be read as providing support for a specific policy.

<u>Model #3: What distinguishes those regions that are able to recover from chronic low-growth from those that are not?</u>

Table 12 presents the employment results for Model 3. Because the model is limited to those regions that are undergoing chronic distress, the number of observations, at 88, is extremely small, and makes it difficult to uncover statistically significant results. We eliminate certain variables (namely, the regional dummies) in order to focus on certain variables of note. Only one variable attains statistical significance at the 5 percent level: the percent of the population that is non-Hispanic black. Metro areas with a one percentage point increase in the percent of their population that is non-Hispanic black are 2.9 percentage points less likely to recover from chronic distress. Table 16 finds no statistically significant results in the GMP data.

<u>Model #4: For those regions that do recover, what accounts for the duration of their recovery?</u>

The coefficients in Model 4, as with those of Model 2, are presented as hazard ratios. In addition to the percent of the population that is non-Hispanic black, two other variables have hazard ratios less than one and are statistically significant at the five percent level: wages per worker, percent of employment in health care and social assistance, and the Herfindahl index.

The income ratio and the number of research universities are also statistically significant at the five percent level, with hazard ratios greater than one. A one unit increase in the income ratio is associated with a 30 percentage point increase in the probability of recovering, while an additional research university effectively doubles the probability of recovering in a given year.

While the GMP results, presented in Table 17, also find a negative association between recovery from chronic distress and both a) wages per worker and b) employment in health care, the hazard ratio on the number of export industries is much greater than 1 and statistically significant. This suggests that a number of large industries that are significant to the regional economy may contribute to a recovery of GMP but not necessary to a recovery in overall employment. It is difficult to draw a causal interpretation for the health care results as employment in that sector may simply be steady as a proportion of the population; that is, as a region sees periods of growth and decline, health care employment remains steady but increases or decreases in proportion to employment in other, more cyclical industries.

VII. Summary and Conclusion

Table 9 summarizes our regressions findings for a few key variables. Several results are consistent across both employment and GMP results. Low educational attainment is associated with slow-growth in both employment and output. High wages per worker are associated with chronic-distress, and may also hinder recovery. While income inequality is positively associated with chronic distress, it also appears positively associated with recovery. Regions whose population is less than 1 million and that are far away from a metro of that size are also more likely to experience chronic distress.

The results for educational attainment conform to previous conclusions about the importance of skilled workers in the U.S. economy over the last 25 years. The finding for distance to a large metro area is in a sense a corollary: capital, both in the form of skilled workers and regional infrastructure and linkages, is a necessary condition for sustained growth. More isolated metro areas, with less than a million in population may lack the benefits of agglomeration economies.

High wages per worker, associated here with both chronic distress and an inability to recover, are likely correlated with high levels of unemployment as lower skilled workers are laid off and firms retain only their most productive workers. Inequality, in the form of a large gap between workers at the 80th percentile and workers at the 20th percentile, may contribute to the deterioration of the social and political fabric of a region, as has been previously documented.

The findings for education attainment and income inequality largely parallel the results of our earlier work on economic shocks (Hill et. al., 2012). That paper finds that regions with low levels of education are more likely to experience downturns; this paper suggests that such regions are also more likely to experience periods of sustained low-growth. Both papers indicate that high income inequality is associated with downturns, and both papers also find that such inequality may hasten recovery. On the other hand, the findings here regarding wages per worker and distance from a large metro area are novel and suggest that these variables may have long-term effects on growth that are not easily captured by studies that focus on the short-term.

Of course, these findings do not present any simple policy solutions. For the most part, they affirm the importance of capital investments, infrastructure, and human and social capital to the ability of regions to maintain economic growth. If anything, these results bolster the case for capital investment even more than has been previously documented. Without resources to draw upon – be they in the form of an educated population or seed money for investments – metropolitan areas in the United States have few opportunities to escape a cycle of decline.

Table 9: Summary of quantitative results

	Cross-sectional: Region is chronically distressed		Hazard model: Region is chronically-distressed		Cross-sectional: Region recovers from chronic distress		Hazard Model: Region recovers from chronic distress	
	Employment	GMP	Employment	GMP	Employment	GMP	Employment	GMP
Low educational attainment	+	+	+	+	0	0	0	0
Wages per worker	0	+	+	+	0	0	-	-
High Income inequality	+	+	+	+	0	0	+	+
Percent of employment in health care and social assistance	+	0	0	-	0	0	-	-
Distance to large metro area	+	+	+	+	0	0	0	0

Employment Models

Table 10: Cross-sectional logit. Dependent variable equals 1 if region is chronically distressed.

VARIABLES	Marginal Effects
Percent metro with a high school-level education or less (pop 25+)	0.0188***
	(0.00397)
Lagged total employment	5.82e-05
	(5.61e-05)
Wages per worker	0.00627
	(0.00464)
Percent of employment in manufacturing	0.000766
	(0.00354)
Percent of employment in health care and social assistance	0.0136*
	(0.00766)
Percent of employment in tourism-related industries	-0.00438
	(0.00635)
Number of export industries	-0.00257
	(0.0104)
Herfindahl index	-0.00121
	(0.0123)
Northeast region	0.303*
	(0.162)
Midwest region	0.218*
	(0.124)
Southern region	-0.0988
	(0.0931)
Number of research universities	-0.0106
	(0.0339)
Right-to-work state	-0.0268
	(0.0642)
Percent of metro population non-hispanic black	-0.00106
	(0.00254)
Percent of metro population hispanic	-0.00259
	(0.00177)
80-20 income ratio	0.0164***
	(0.00495)
Distance to large metro	0.0188*
	(0.00988)
Observations	360

Coefficients represent marginal effects. Standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 11: Hazard model. Dependent variable equals 1 in the year that a region becomes chronically-distressed.

VARIABLES	Hazard ratios
Percent metro with a high school-level education or less (pop 25+)	1.322***
	(0.0334)
Lagged total employment	1.000
	(0.000595)
Wages per worker	1.182***
	(0.0312)
Percent of employment in manufacturing	0.981
	(0.0170)
Percent of employment in health care and social assistance	0.979
	(0.0746)
Percent of employment in tourism-related industries	0.917**
	(0.0377)
Number of export industries	0.970
	(0.0815)
Herfindahl index	1.016
	(0.0470)
Northeast region	3.007
	(2.577)
Midwest region	1.808
	(1.388)
Southern region	0.447
	(0.378)
Number of research universities	1.353
	(0.455)
Right-to-work state	0.386
	(0.243)
Percent of metro population non-hispanic black	0.992
	(0.0185)
Percent of metro population hispanic	0.978*
	(0.0116)
80-20 income ratio	1.082**
	(0.0367)
Distance to large metro	1.107*
	(0.0579)
Observations	7,187

Robust, clustered standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 12: Cross-sectional logit. Dependent variable equals 1 if the region recovers from chronic distress.

VARIABLES	Marginal Effects
Percent metro with a high school-level education or less (pop 25+)	-0.00708
	(0.0132)
Lagged total employment	0.000417*
	(0.000240)
Wages per worker	-0.0147
	(0.0171)
Percent of employment in manufacturing	-0.00501
	(0.0138)
Percent of employment in non-durable manufacturing	0.00280
	(0.0295)
Percent of employment in health care and social assistance	-0.0449
	(0.0385)
Percent of employment in tourism-related industries	0.0632
	(0.0432)
Number of export industries	0.00543
	(0.0329)
Herfindahl index	-0.0386
	(0.0666)
Number of research universities	-0.173
	(0.139)
Right-to-work state	0.130
	(0.222)
Percent of metro population non-hispanic black	-0.0239**
	(0.0116)
Percent of metro population hispanic	0.0109
	(0.0108)
80-20 income ratio	-0.00561
	(0.0216)
Distance to large metro	0.0416
	(0.0821)
Observations	88

Coefficients represent marginal effects. Standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 13: Hazard model. Dependent variable equals 1 in the first year of recovery from chronic distress.

VARIABLES	Hazard Ratios
Percent metro with a high school-level education or less (pop 25+)	1.011
	(0.0319)
Lagged total employment	1.000
	(0.000347)
Wages per worker	0.719***
	(0.0882)
Percent of employment in manufacturing	1.100**
	(0.0495)
Percent of employment in health care and social assistance	0.616***
	(0.0601)
Percent of employment in tourism-related industries	1.190
	(0.278)
Number of export industries	0.878
	(0.0873)
Herfindahl index	0.629***
	(0.103)
Number of research universities	2.002**
	(0.687)
Right-to-work state	1.545
	(1.203)
Percent of metro population non-hispanic black	0.861***
	(0.0409)
Percent of metro population hispanic	1.004
	(0.0200)
80-20 income ratio	1.260***
	(0.0745)
Distance to large metro	1.025
	(0.181)
Observations	445

Robust, clustered standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

GMP Models

Table 14: Cross-sectional logit (GMP). Dependent variable equals 1 if region is chronically distressed.

VARIABLES	Marginal Effects
Percent metro with a high school-level education or less (pop 25+)	0.00975**
	(0.00397)
Lagged GMP	-3.30e-09*
	(1.69e-09)
Wages per worker	0.00805*
	(0.00469)
Percent of employment in manufacturing	-0.00178
	(0.00294)
Percent of employment in health care and social assistance	0.00997
	(0.00653)
Percent of employment in tourism-related industries	0.00439
	(0.00507)
Number of export industries	0.00550
	(0.00737)
Herfindahl index	0.00334
	(0.00895)
Northeast region	0.166
	(0.127)
Midwest region	0.154
	(0.104)
Southern region	0.0767
	(0.0834)
Number of research universities	-0.0293
	(0.0465)
Right-to-work state	-0.0757
	(0.0544)
Percent of metro population non-hispanic black	-0.000827
	(0.00194)
Percent of metro population hispanic	-0.00343**
	(0.00174)
80-20 income ratio	0.0131**
	(0.00526)
Distance to large metro	0.0496**
	(0.0210)
Observations	360

Coefficients represent marginal effects. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 15: Hazard model. (GMP). Dependent variable equals 1 in the year that a region becomes chronically-distressed.

VARIABLES	Hazard ratios
Percent metro with a high school-level education or less (pop 25+)	1.205***
	(0.0324)
Lagged GMP	1.000*
	(2.24e-08)
Wages per worker	1.129***
	(0.0417)
Percent of employment in manufacturing	0.933**
	(0.0266)
Percent of employment in health care and social assistance	0.872**
	(0.0583)
Percent of employment in tourism-related industries	1.002
	(0.0313)
Number of export industries	0.908
	(0.0565)
Herfindahl index	0.886
	(0.0956)
Northeast region	0.906
	(0.763)
Midwest region	1.819
	(1.342)
Southern region	1.441
	(1.210)
Number of research universities	0.721
	(0.317)
Right-to-work state	0.178***
	(0.112)
Percent of metro population non-hispanic black	0.978
	(0.0157)
Percent of metro population hispanic	0.952***
	(0.0123)
80-20 income ratio	1.139***
	(0.0275)
Distance to large metro	1.256***
	(0.0514)
Observations	4,806

Robust, clustered standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 16: Cross-sectional logit (GMP). Dependent variable equals 1 if the region recovers from chronic distress.

VARIABLES	Marginal Effects
Percent metro with a high school-level education or less (pop 25+)	7.77e-05
	(0.00160)
Lagged GMP	1.23e-09
	(1.60e-09)
Wages per worker	-0.00381
	(0.00391)
Percent of employment in manufacturing	-0.00487
	(0.00429)
Percent of employment in health care and social assistance	-0.00616
	(0.00557)
Percent of employment in tourism-related industries	-0.00710
	(0.00695)
Number of export industries	-0.000798
	(0.00329)
Herfindahl index	-0.00715
	(0.00853)
Number of research universities	-0.0102
	(0.0239)
Right-to-work state	0.0182
	(0.0358)
Percent of metro population non-hispanic black	-0.000596
	(0.00117)
Percent of metro population hispanic	-0.00120
	(0.00170)
80-20 income ratio	0.00256
	(0.00341)
Distance to large metro	-0.000561
	(0.00306)
Observations	89

Coefficients represent marginal effects. Standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 17: Hazard model (GMP). Dependent variable equals 1 in the first year of recovery from chronic distress.

VARIABLES	Hazard Ratios
Percent metro with a high school-level education or less (pop 25+)	0.546
	(0.245)
Lagged GMP	1.000*
	(9.13e-08)
Wages per worker	0.254**
	(0.175)
Percent of employment in manufacturing	0.581***
	(0.117)
Percent of employment in health care and social assistance	0.114***
	(0.0926)
Percent of employment in tourism-related industries	0.108***
	(0.0843)
Number of export industries	3.013***
	(1.077)
Herfindahl index	0.00265**
	(0.00690)
Number of research universities	0.0549*
	(0.0953)
Right-to-work state	52.03
	(242.9)
Percent of metro population non-hispanic black	0.794
	(0.159)
Percent of metro population hispanic	0.968
	(0.0628)
80-20 income ratio	3.453**
	(1.947)
Distance to large metro	0.769
	(0.714)
Observations	268

Robust, clustered standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

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