

“Rural Manufacturing Resilience - Factors Associated with Plant Survival” Webinar Transcription  
May 23, 2017

Good afternoon everyone and welcome to our webinar,  
Rural Manufacturing: Resilience Factors  
Associated with Plant Survival. My name is Nancy  
McNiff and I will be your host. This webinar  
is being recorded and will be posted at a later date  
on the ERS website. At any time during the webinar,  
you may enter a question into the chat  
feature at the bottom left corner of your screen and  
the speaker will answer your questions at the end  
of the presentation. Our speaker today is  
Sarah Low. Sarah is an economist with the Rural  
Economy Branch at the Economic Research  
Service U.S. Department of Agriculture.  
Sarah has a Ph D. in agricultural and  
consumer economics from the University of Illinois  
Urbana-Champaign. Her research interests include  
rural economic development, entrepreneurship, labor,  
land use, amenities and spatial analysis.  
Welcome Sarah and I think we're ready to start  
so you can begin your presentation now.  
Thank you Nancy. Good afternoon everyone and  
thanks for joining me. As Nancy mentioned this webinar  
is based upon that recently released ERS  
report and I'm also required to say that this  
research was conducted with restricted access to  
BLS data and the views expressed here do not

necessarily reflect the views of BLS.

Okay let's get started everyone.

Just to kind of give you an idea where we're headed today I'm going to start with a brief overview of the study and the results then I'll explain the data and the statistical model used in the analysis before discussing the results and concluding.

All right this research project asked the question what factors were related to rural manufacturing plant survival 1996 to 2011? I examined the survival of manufacturing plants who participated in an in-depth ERS survey in 1996. I then linked the survey respondents to data at BLS to try and explain survival fifteen years after the survey. Here I'm defining survival as having at least one paid employee and although survival is only one indicator of manufacturing plant success it's something that we can assess easily with administrative data and for a large number of plants.

Alright. Throughout this presentation I will refer to non metropolitan counties as rural counties and metropolitan counties as urban counties. To preview the results I find that rural plants were more likely to survive than plants in urban counties. So again plants in non metro areas were more likely to survive than

plants the metro areas and among rural plants all else being equal independent plants were more likely to survive than multi-unit plants and smaller independent plants are more likely to survive than larger independent plants.

Alright just to provide a little context for this study, the study period 1996-2011 was one of general manufacturing employment decline as you can see in this chart rural manufacturing jobs have declined over, from the beginning of the study period until just after the end of the last recession. The good news for rural manufacturing employment is that it has been relatively steady in the year since the Great Recession and despite a declining share of employment during the study period, manufacturing provided almost twice as many jobs and three times the earnings of production agriculture in 2011 despite record high Ag prices and earnings that year. So that kind of just puts into perspective the size of the manufacturing sector in rural areas. Another analogy that might be helpful to you, rural manufacturing employment is approximately equal to rural retail trade employment, so it gives you an idea if you think about all the people working in retail that's similar to the number of people who are working in manufacturing in rural America.

Okay this product, this project used some pretty unique data as I mentioned the 1996 ERS rural manufacturing survey was linked to the quarterly census of employment and wages based upon establishment name and address. Linking the in-depth survey to the employment census allows us to follow survey respondents over time. The bad part is we only have the in-depth information for 1996 but the good part is we can follow these plants over time every quarter, so that's kind of nice. The matching rate for the linking was exceptionally high for this sort of activity especially using data from the mid-90's when a lot of the addresses were P.O. boxes or rural routes for example, so we had an 88 percent match rate. Six states were excluded from the analysis but despite some of them being manufacturing heavy, heavy states, the final sample is still pretty representative of U.S. manufacturing in 1996.

Alright let me just start with some summary statistics. Just over half the plants survived the duration of the fifteen year survey period study period. So 55 percent of all plants overall survived. Rural plants were more likely to survive at 57 percent and urban plants had a 52 percent survival rate. Rural independent plants

had a 62 percent survival rate while rural multi-unit plants such as a branch plant had a survival rate of 50 percent. The survival rate also varied a lot by industry, the rural textile and apparel industries had only a 26 percent survival rate.

To help disentangle the effect of say industry and whether the ownership structure is single unit or multiple unit and how those two are related to survival, this report relies on the statistical analysis known as hazard analysis. The variable of interest is the time interval between the 1996 survey and a plant's exit if that occurred. I used what is called a Cox proportional hazards model to relate the amount of time until plant failure with plant characteristics and county characteristics. I control for the statistical effect of certain factors related to survival rates and these are the so-called explanatory variables. So on this one I have listed all the explanatory variables quite a few of them are from the survey I tried to use explanatory variables from the survey when possible others are from census data. And like I said only the dependent variable, the survival is from the BLS data.

Okay let's dive into the results. Before I dive in I

just want to point out to even interpretation, I've converted the results into a percent increase in the probability of survival with a higher value for each variable of interest. So, so let's just start of the top here when we're looking when we pool all the plants together, we find that independent plants are 27 percent more likely to survive conditional on all those explanatory variables that we talked about in the last slide then multi-unit plants. So conditional on all those things independent plants are 27 percent more likely to survive. Then I wanted to look at rural versus urban. So looking at the whole sample again we find plants in rural counties are 23 percent more likely to survive than plants located in metro counties. I also want to tease out the differences between metro and non metro for the urban for the independent and multi-unit plants. So when only looking at the Independent plants, all the independent plants I find that the ones in rural counties are 35 percent more likely to survive than the ones in metro counties and I actually don't find any difference between rural and urban survival rates for multi-unit plants so this suggests that the independent plants are really the ones driving this metro/non metro or rural/urban result so that's kind of a kind of an interesting result. I think partly what's

driving this is that the urban environment is more competitive and also that independent rural plants may stay in business longer than optimal due to idiosyncratic reasons such as they are a family business and there may be or and or fewer alternate investment opportunities as opposed to a similar business in an urban environment, so there's a, there's quite a few potential explanations for that some of them due to just, just the nature of doing business in the rural areas.

Okay next slide. So now I'm going to focus my results only on the rural plants that's our purview here at ERS. And I'm also splitting the independent and multi-unit plants apart in the analysis partly because the results are so different for the independent plants versus the multi-unit or branch plants. Okay, so looking at size I find that smaller manufacturing plants are more likely to survive in rural areas than the larger independent manufacturing plants but there's no, no effect for the multi-unit plants. So more specifically rural independent plant with 100 employees is 9 percent more likely to survive than a rural independent plant with 200 employees. I also wanted to highlight the industry results. Again I mentioned textile and apparel were particularly hard hit during this study period and here we see that for example the

apparel plants were almost 200 percent less likely to survive so that's about three times less likely to survive than food manufacturing which was my base line. None of the other manufacturing industries had a significant difference in survival compared to food then, but textile apparel really did. So that was kind of an interesting, interesting finding, again these are not all the findings, there's more findings in the paper but these are just the findings I want to highlight. Okay. My third and final results slide. So this is kind of, before and before I dive into these results. This is kind of interesting slide because a lot of manufacturing plant survival studies look at size and industry and ownership structure, the things that were already talked about primarily because that's what we have data on, so one really unique thing about this study using the ERS rural manufacturing survey is that we had some variable, some information that we really never used in survival studies for example capital availability, like I'm going to talk about here.

So with, with that the caveat of course is that these findings are based on imperfect data. The survey only asks about perceptions so is capital a major problem or a minor problem? So that's one, one downside to using the survey and of course the difficulty in accessing capital and the importance



of various government programs are not assessed. The, the difficulty is accessed not necessarily the participation. Also we have to keep in mind these findings are not necessarily causal rather they suggest further research may be warranted and again because we get the information from the survey in 1996, we don't know if a plant say got a government guaranteed loan right after the survey, we're only able to observe that information in the survey in 1996.

Okay. So again some selected results.

We find that plants that indicated obtaining financial capital was a major problem were 29 percent more likely to fail than plants indicating it was a minor problem or not a problem and that for the rural independent plants. The effect was smaller for the rural multi-unit plants, 31 percent more likely to fail. Now again like I just said these aren't necessarily causal, plants that are having trouble getting access to financial capital maybe there's a reason they're having trouble getting access and that's tied to their failure. We don't really know but this is an interesting result that there was a high correlation between the perception that obtaining capital was a major problem and subsequent failure.

We also asked, the survey also asked whether government direct loans were important and we

didn't find any statistically significant effect on the government direct loans. Part of that is this is a relatively small group. 13 percent of the plants I think had this type of, indicated they had this type of loan and only about a third of those said it was important so we're talking you know about 5 percent of the sample here so we don't have a lot of power on these tests. For the government guaranteed loans, if a small, if not, sorry not a small, if a rural independent plant indicated that government guaranteed loans were important to that plant they are actually 74 percent more likely to fail whereas for the multi-unit plants there are 45 percent less likely to fail. This is a very interesting result and on the surface seems counterintuitive. Why would one be more likely to fail and the other less likely to fail? And I think the reason for this is that this survey question lumped together a lot of different type of government loan guaranteed programs and the two different types of loan, government loan guaranteed programs are either for companies that can't get a regular loan and so they get a government guaranteed loan and low and different underwriting standards whereas the USDA business and industry guaranteed loan program, the manufacturing plant getting the loan actually has to meet all the regular underwriting

standards so they have to meet the credit score, all these different things that you would have to meet to get a regular loan even without the loan guarantee.

So my hypothesis on this is that the multi-unit plants might be more likely to participate in the kind of program that the USDA business and industry loan guaranteed program is and that the independent single unit you know rural plants might be more likely to participate in the programs that are helping plants that can't otherwise get access to financial capital and kind of like in the first one here obtaining capital being a major problem it's more of a correlation it's not that the government guaranteed loans are causing them to fail it's more that they couldn't get access to traditional credit and which is maybe an indicator of other problems and correlated with them potentially failing.

So that's a lot to discuss there and there's more in the report but I'm glad to answer questions on that just type them into the chat.

Okay just to summarize the findings one more time. All else being equal the independent plants are 27 percent more likely to survive than plants part of a multi-unit firm. Plants in rural counties are 23 percent more likely to survive than those in urban counties and when we focus

on our rural independent plants we find that the smaller plants are more likely to survive, the apparel and textile plants are the least likely to survive compared to all the other industries or with food manufacturing as the base. And plants reporting that obtaining capital was a major problem were more likely to fail. Okay so to conclude. Higher dependence on manufacturing jobs and income suggest that rural plants survival is integral to communities in which they are located. So a community that has a rural manufacturing plant probably a lot of people and a lot of money coming into that community depend on that particular plant. Results offer potential insights into rural economic development policy for example results maybe you know suggest retention policies should be examined with the knowledge that multi-unit plant retention is more idiosyncratic than single unit plant retention. If you take a look at the report you'll see that the single unit or independent plant survival was easier to predict whereas the multi-unit plant survival was a little more idiosyncratic. And you know another, another point is that another you know conclusion from these results are that more research would be helpful for example especially in the financial capital question. So access to financial

capital may be related to rural manufacturing plant survival. The more research is necessary to really understand this relationship but there were some interesting findings here and some of us at ERS hope to doing more research on this in the future. And with that I will take questions I have the link to the full report right here and there's also a journal article that uses the same data but looks at a little bit different question, it kind of focuses on localization and competitiveness as they relate to plant survival and that's written by myself and Jason Brown and it's available in Growth and Change.

Nancy do you have any questions for me? I know that it looks like and I'm looking at the chat and it looks like some of you guys have some audio problems so hopefully everybody's....

So at this point, at the beginning of the presentation a few people had some problems so you may have to go back if the questions pertain to earlier slides but let's start out with a question about the survey in 1996. Was the survey representative of all manufacturing plants or just rural planning? Great question. Okay so the survey was with weights nationally representative of all manufacturing plants with ten or more employees. What was unique about this survey is that we did a rural over sample. So if we, if we sampled

just based on you know being nationally representative we'd have a lot of plants in metro areas because that's where the majority of them are so this, this particular survey had a rural oversample and then we use survey weights to make it nationally representative. What the rural oversample does and it gives us a lot more observations and more detailed information about rural plants specifically but it's really nice to be able to compare the of rural and urban. I have a question about were there any significant differences geographically among the rural plants that you were looking?

Yes, I didn't talk about it in today's webinar but in the report there is actually a section on plants in the South and so what I found is that during this particular time period plants in the South even controlling for industry, plants in the South were much more likely to fail than plants in other regions of the country and I offer some hypotheses about why that might be in the report but also the journal article talks about it a little bit more.

Okay. Can you clarify the difference between or give an example of an independent versus a multi-unit plant?

Yeah good question maybe I should have better explained this during the webinar. So an independent plant is a plant that is part of a firm with only one location, so it's a stand alone plant. It might be owned by an entrepreneur who lives in a rural area

and he opened the plant in his hometown and that's the, that's the only unit for that firm.

In contrast a multi-unit plant is a plant that's part of a firm with multiple locations. So you might think about a Maytag plant. They've got headquarters somewhere and they've got you know one plant maybe making dishwasher engines and then one plant maybe assembling dishwashers or that sort of thing and so that's what we would call those multi-unit plants are either headquarters and then branch plants and so a lot of, a lot of economic development policy in the past has focused on kind of trying to recruit a branch plant like maybe we try and get a John Deere plant to come to our town. So that's kind of what I mean by a multi-unit plant. I hope that answers the question.

Yeah and there's sort of a follow up question.

What are some of the reasons independent plants seem to be more resilient? So good question. Part so, I think there's a couple different things going on here. One is that for the multi-unit plants the decisions or survival or location are generally made at headquarters and they're not made with that community in mind. So to go back to my you know Maytag dishwasher example, at the headquarters of Maytag they're going to do whatever is best for Maytag regardless of you know what the impact you know

on a certain town. Whereas the independent plants I think they're more likely to be locally owned and certainly the independent plants in rural areas are more you know a little more likely to have ties to that community so maybe it's a family business or a multigenerational business with ties to the community and so maybe the plant wants to stay there, maybe they want to operate through a down period even if they're losing a little bit of money on variable costs because the fixed costs have been spent and they're committed to that community or their family works there and they're committed to you know employing their family members. So those are some reasons why a single unit plant may be more likely to survive and then some reasons why the multi-unit plant may be less likely to survive just because you know corporate or headquarters has they're acting optimally for the shareholders, for the entire firm as opposed to just that branch.

Okay. We have a question about textile plants. So the textile plants you said were one of the types who are likely to have disappeared. Could you give examples of types of rural plants that had a better, had better odds of surviving?

Okay, yes to answer that question I mean statically speaking all the other industries were just as likely to survive you know, you know I



don't know if the person asking this question is a stats person or not so the textile and apparel were the only ones statistically significantly different than the rest but the just looking at summary statistics not a statistically significant difference, you know the non-durables that are quintessentially less cyclical were the most likely to survive.

So for example I used food manufacturing as my reference for the industry controls and that's because food manufacturing was the most likely to survive during this study period. Okay. Somebody is asking a question because they missed the beginning of the presentation. How did you, can you explain how you tracked the individual plants from 1996-2011? He didn't hear the part about the survey was done in 1996 but then what did you do? Right, yes, yeah the survey was conducted by ERS in 1996. I kind of picked it up and recycled it a few a few years later and essentially what I did is I used the names and addresses in the survey response and linked to the BLS quarterly census of employment and wages by the same name and address and so that, that QCW data that's the state unemployment insurance records formerly known as ES202 data if you're familiar with that, so almost all the states that are participating with BLS at that time participated in the survey so I was able to basically take the survey and link them to

the quarterly unemployment records and that's what I used to track the plants over time.

Okay. Does the message, is the message of this that management practices don't seem to matter is that accurate? So I didn't, I didn't talk about management practices there was a section in this survey on management practices and I don't cover it in this report but what we found is that the particular questions about management practices that were asked in the 1996 survey were not related to survival. So I can't say that, that necessarily management practices don't matter. I just didn't find a statistically significant relationship with survival in this particular study. Okay.

One last question, with the survey data are you able to break the rural plants counties down further by RUCC categories in order to see a proximity to a metro area has an impact?

Okay. Yes with the confidential data I know you know I know exactly where the plants are located so I didn't, I didn't actually use RUP codes but I did do some other things looking at proximity and what I actually found is including a variable that the GIS team here at ERS calculated which is essentially driving time from the county to the nearest urbanized area and I actually didn't, other than the metro/non metro finding I didn't find a lot of variation within

that. So if you look at the journal article I actually control for non metro adjacent to metro and non metro non-adjacent and don't find any differing results, so I didn't find a lot of that there's also some interesting questions in the survey about I think the, I think you mentioned supply chains Nancy. There's some interesting questions in the survey that ask if you know inputs, are inputs related within an hour drive or can you get expertise technical assistance within an hour drive and in the journal article that I mentioned the Growth and Change article, I encourage this question ask her to take a look at that I do include both input and access to markets within a one hour drive of the plant based on because that was a question in the survey and I do find a weak effect for inputs being related to survival so if you're closer to your inputs you're a little more likely to survive but there's more details on that in the journal article. The ERS report does not cover that particular question.

Okay. We got a couple of last minute questions. In the paper or report do you discuss the potential impact that trade adjustments might play or that have if that trade played in this? You know I don't, I don't go into a lot about trade there's a few citations in the report. You know everything

we do here has very technical review and also clearance by upper levels of USDA management and the upper level clearance suggested that they didn't want us to talk you know anything about trade just because it was not a focus of this report. You know with the industry control variables that are controlling for all the different manufacturing industries I would assume that a lot of the trade effects are absorbed by those industries fixed effects. So there's, there's of course mention of trade because that was a huge shaping factor for manufacturing during the study period but we don't do any additional work on trade beyond that. There was a question in the survey that asked about the percent of sales that went abroad. So kind of so essentially a trade, a proxy question and I did not find that the percent of exports was related to plant survival.

Okay, do you have any observations about rural versus urban anything about aversion to urban or metro locations based in the data?

Oh aversion to these locations based on the data?

(Crosstalk) Yeah so I

don't have, sorry I just don't have a really good answer to that question. I mean I think that question is coming a little bit from the other end from the, from the manufacturing location study literature and there's a huge literature on the location of

manufacturers and where they, where they choose to, to locate but I'm kind of, this study really focused on the otherend of things given location of a manufacturer, what are the characteristics associated with their survival so there is a large literature on that question but there's not much in this particular article on that. Okay that's all the questions that we have. Thank you all for joining us and thank you very much Sarah. Everyone have a great rest of your day. We appreciate your participation.

Great, thank you everyone.