

High Unemployment Yet Few Small Firms

Appendix: Model, Maps, and Auxilliary

Tables

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1 Maps and First Stage

Bargaining council coverage is quite varied across South Africa, with different regions having bargaining council agreements at different times. The (a) panels of figures one through four show magisterial districts which feature bargaining council agreements in each industry during all, some, or none of the four years 2000-2003. These panels highlight that, while bargaining councils usually take place over blocks of larger geographic regions, there are sometimes exclusions or inclusions outside of political boundaries. My measurement of bargaining council status is given by an explicit mention of coverage of a bargaining council in labor law. Counting measures like this one will necessarily be biased towards underreporting agreement coverage through the potential of omission, though careful checks of datawork were undertaken in an effort to limit the extent of that bias. Both to reduce the potential of endogenously defined boundaries and to minimize the effects of measurement error caused by omission bias I instrument actual bargaining council status in the paper with bargaining council eligibility. A district is defined as bargaining council-eligible if any other magisterial district in that district council reports the presence of a bargaining council agreement in that

industry in that year. The (b) panels of each figure show this instrument. As the reader can see, the instrument closely resembles the true data.

As a result of this close fit, it is unsurprising that the first stage is also strong in a statistical sense. In all specifications, the t-statistic of Bargaining council status on bargaining council eligibility is at least 9.8. These estimates are presented in table 1.

Finally, these maps give a good sense of which places are covered by bargaining council agreements in each year. However, they do not give a great sense of year to year fluctuations in each of these industries. That is covered in table 2, which presents, for each industry, the number of magisterial districts covered by a bargaining council in each year, as well as the number of districts which add or remove bargaining councils. This table also includes the reported unionization rate for each industry in each year from the labour force surveys. I note, however, that these numbers are somewhat hard to interpret as unionization reports and actual union membership are likely endogenous to the presence of bargaining councils.

2 Model

For all groups of firms, assume that total demand at price p is given by $D_t(p)$ in town t ¹. The wage that would be set by a bargaining council, w^{BC} , is in between the equilibrium wage, w^* , and the privately negotiated union wage, w^U . It is useful to separate firms by category, that is, into self employment, small firms, large unionized firms, and large non-unionized firms. For modelling purposes, small firms differ from large firms in that large firms have capital \bar{k} , and can choose to hire L laborers to maximize profits, while small firms hire a single worker

¹All variables (i.e. demand, production technologies, etc.) are presumed to vary across industries; this subscript is omitted for notational simplicity.

and have no capital. In the model below, I abstract from the potential of single worker or small firms to avoid labor arbitration; in the empirical section, I will consider these groups separately.

2.1 Small Firms

The good is produced by both small and large firms, where small firms produce quantity $S_t^s(p)$ and large firms produce $S_t^L(p)$. Small firms are heterogeneous with respect to production technologies. Each small firm hires a single worker, and firm f produces quantity q_f . Therefore, for a given wage w , and price p , small firms in industry i demand $n_t(w, p)$ units of labor where $n_t(w, p)$ represents the number of firms for whom q_f is greater than w/p . Suppose wages are set by the intersection of labor supply and labor demand for small firms, resulting in a wage $w_t^*(p)$. If we order small firms in terms of productivity, the total output of small firms is thus given by

$$S_t^s(p) = \sum_{\{f: q_f \geq w_t^*(p)/p\}} q_f \quad (1)$$

using $n_t(w^*, p)$ units of labor.

If a bargaining council mandates wages, then all small firms are required to pay wage w^{BC2} . Bargaining council wages are binding, and small firms produce

$$S_{tBC}^s(p) = \sum_{\{f: q_f \geq w^{BC}/p\}} q_f \quad (2)$$

²In a more general and realistic model, only some fraction of small firms would be obliged to pay w^{BC} as enforcement would not be perfect. I abstract from this; however, if enforcement capacity varies it also may enter into the decision to pursue a bargaining council agreement.

where $S_{iBC}^s(p) < S_t^s(p)$, and $n_t^{BC}(p) < n_t^*(p)$ firms producing for all p . Note that small firms employ fewer workers in the presence of a bargaining council if

$$w^{BC}/p^{BC} > w_t^*/p_t^{nBC}$$

where p_t^{BC} and p_t^{nBC} denote prices in the presence or absence of a bargaining council agreement.

2.2 Large Firms

There are two types of large firms: unionized large firms and non-unionized large firms. Both types of firms have \bar{k} units of capital and access to a concave production technology, $f(L, \bar{k})$. In the absence of bargaining councils, unionized large firms pay w^U which is mandated by the local union, and hires $L^U(p)$ units of labor by setting $w^U = p \frac{\partial f(L, \bar{k})}{\partial L}$. Each unionized large firm thus produces $f(L^U(p), \bar{k})$ units of output. In contrast, non-unionized large firms pay wage w_t^* and set $w_t^* = p \frac{\partial f(L, \bar{k})}{\partial L}$, to hire $L_t^*(p)$ units of labor. If there are Q_t large firms, fraction λ of whom are unionized, large firm output is given by

$$Q_t [\lambda f(L^U(p), \bar{k}) + (1 - \lambda) f(L_t^*(p), \bar{k})] \quad (3)$$

If a bargaining council agreement is passed, all large firms are forced to pay wages w^{BC} . Therefore, large firms hire $L^{BC}(p)$ units of labor by setting $w^{BC} = p \frac{\partial f(L, \bar{k})}{\partial L}$, and each produce $f(L^{BC}(p), \bar{k})$, so that large firm output is given by $Q_t f(L^{BC}(p), \bar{k})$. Nonunionized large firms will employ fewer workers (and produce less) in the presence of a bargaining council agreement if $w^{BC}/p^{BC} > w_t^*/p_t^{nBC}$, while unionized large firms employ fewer workers

if $w^{BC}/p^{BC} > w^U/p_t^{nBC}$ by the concavity of the production function.

2.3 Equilibrium

In equilibrium, prices adjust until supply equals demand, so that, in the absence of a bargaining council agreement,

$$Q_t [\lambda f(L^U(p_t^{nBC}), \bar{k}) + (1 - \lambda) f(L^*(p_t^{nBC}), \bar{k})] + n_t^*(p_t^{nBC}) = D_t(p_t^{nBC})$$

Unionized large firms earn (short-run) profit $\pi_{it}^U = p_t^U f(L^U(p_t^{nBC}), \bar{k}) - w^U L^U(p_t^{nBC}) - r\bar{k}$, where r is the rental rate of capital. In the long run, firms would adjust their capital stock; this will not help in motivating the empirical analysis below so I abstract from it. Non-unionized large firms earn $\pi_t^* = p_t^{nBC} f(L^*(p_t^{nBC}), \bar{k}) - w_t^* L_t^*(p_t^{nBC}) - r\bar{k}$. Since $w_t^* < w^U$, non-unionized large firms both hire more labor and are more profitable.

Under a bargaining council agreement,

$$Q_t f(L^{BC}(p^{BC}), \bar{k}) + n_t^{BC}(p^{BC}) = D_t(p^{BC})$$

and each large firm earns profit $p^{BC} f(L^{BC}(p^{BC}), \bar{k}) - w^{BC} L^{BC}(p^{BC}) - r\bar{k}$. Equilibrium in this model has several predictions. First, employment in small firms and in non-unionized large firms will fall in the presence of a bargaining council agreement. This happens as, if prices stay the same or fall, then $w^{BC}/p^{BC} > w_t^*/p_t^{nBC}$ since $w^{BC} > w_t^*$ by assumption. However, if prices rise, then at least one type of firm must be producing less (and, hence, employing fewer workers). Since $w_t^*/p_t^{nBC} < w^U/p_t^{nBC}$, small firms and large non-unionized firms will cut employment whenever large unionized firms do, and hence if anyone is employ-

ing fewer workers, both small firms and large non-unionized firms are. A similar argument reveals that large, unionized firms must be increasing output in response to the lower, bargaining council wages³. Therefore, small firms will overall employ fewer workers under the bargaining council regime, while the direction of the large firm employment effect will depend on λ and the production function. Overall employment also has ambiguous predictions in principle. However, since small firms are more labor intensive than large firms, we may anticipate that the growth in employment in unionized large firms is overbalanced by the shrinking employment in small firms.

3 Auxilliary Tables and Figures

The remainder of the appendix presents tables and figures which were omitted from the main draft for space limitations.

3.1 Worker Composition

Table 3 tests the importance of worker composition effects using spatial fixed effects with a 50 mile radius. Column 1 reports wage estimates when we control for the fraction male, mean education, fraction African, potential experience and potential experience squared. We see that controlling for these observable characteristics attenuates the effect of bargaining councils on wages somewhat, with estimated effects dropping by about 5 percentage points. Columns 2 through 4 look at how each of these variables changes with bargaining council status, and we observe that the big difference is in the gender of employees. When a

³If prices lower, than at least one type of firm must be increasing output; since we know that small firms and non-unionized large firms are not, it must be the case that large unionized firms are. In contrast, if prices are higher, than $w^U/p^{nBC} > w^{BC}/p^{BC}$ and large firms increase employment.

bargaining council is present in an industry, the fraction of the labor force which is male increases by 4 to 13 percentage points. Education, age, and racial composition of the labor force are not robustly associated with bargaining council status. The education result is consistent with other studies (e.g. Magruder 2010) which find that education is not a strong predictor of employment in South Africa, and the lack of an impact on racial composition may indicate either the success of South African equal opportunity law or that the extent of racial disparities allows little potential for substitution between racial groups. However, the age result is on surface somewhat surprising, as bargaining council agreements often include hiring and firing regulations as well as wage standards. In a high unemployment context, age is a poor proxy for tenure, which we might expect to increase in the presence of hiring and firing restrictions. We can directly investigate the effect of bargaining council agreements on tenure; this requires using the sub-sample which responded to the tenure question. In column 6, I report the effect of bargaining councils on mean log tenure at the plant. Mean tenures are increasing by about 18-19% in response to bargaining council regulations⁴.

3.2 Spatial-Industry-Year Fixed Effects

As described in the paper, an alternate approach to the panel would be to allow the same magisterial district-industry to have different fixed effects in each year. Just as in the case of the spatial-industry fixed effects employed throughout the main paper, we can estimate

⁴In the wage sample, we do not find precise estimates comparing within a town-industry over time, while in the tenure sample, we do not find precise estimates comparing within a town-year across industries. This may be a case of sticky wages, or constant turnover across industries within a labor market; however, it may also be a case of low power in these estimations, and we cannot rule out similarly-sized effects. Non-response in the tenure variable is not closely associated with non-response in the wage variable, and so the sample which has both of these is further reduced; examining the effects of bargaining councils on tenure and wages in this sub-sample produces similar, though sometimes noisier, estimates.

spatial-industry-year fixed effects.

$$\begin{aligned}
Y_{imt} - \frac{1}{n_{R(m)y}} \sum_{m' \in R(m)t} Y_{im't} = & \beta_1 \left(BC_{imt} - \frac{1}{n_{R(m)t}} \sum_{m' \in R(m)t} BC_{im't} \right) \\
& + \Gamma \left(X_{imt} - \frac{1}{n_{R(m)t}} \sum_{m' \in R(m)t} X_{im't} \right) + \nu_{imt} - \frac{1}{n_{R(m)t}} \sum_{m' \in R(m)t} \nu_{im't}
\end{aligned} \tag{4}$$

This approach is directly analogous to a pure spatial RD as it uses no intertemporal variation in constructing estimates. However, differently from the "distance to the border" specification, it only makes comparisons across local observations. As such, it is more flexible than the Spatial FEs, and constructs more accurate comparison groups than a "distance to the border" spatial RD. However, it also asks a lot of the data.

Once again, we can combine this approach with town, town-year, or town-industry fixed effects.

Table 4 shows that the spatial-industry-year fixed effects approach reveals effects which are similar in sign to the main effects and often significantly different from zero just as those effects are. Point estimates, however, are substantially larger: using only spatial variation, we would conclude that employment effects were 10-23% and small firm employment effects were 26-37% rather than the 8-12% estimates using the main specification. These specifications are in general not robust to the inclusion of magisterial district-industry fixed effects; however, I note that such a specification is quite conservative: not only are we requiring labor markets to have non-parametric trends but we are also eliminating any industry-specific component which is persistent. In other words, if we require both of these effects,

we are both unwilling to make the assumption of persistent labor market heterogeneity and unwilling to accept a specification which does not allow for persistent industry-town-specific heterogeneity. These estimates also tend to have huge standard errors, suggesting that the data are not sufficiently well-behaved to have power at this strategy.

A similar trend is found when we estimate wage trends using spatial-industry-year fixed effects, presented in table 5. Once again, bargaining councils are associated with increases in wages; using only spatial variation suggests those increases in wages are even larger in magnitude. Once again, those effects are concentrated among small firm employees, at least once town or town-year specific heterogeneity is controlled for. Estimates are not always precise but the coefficient pattern strongly mirrors that in the main table, with large wage effects overall and on small firm employees, and small or nonexistent wage effects on large firm employees.

Across specifications, the broad trend is that spatial-industry-year fixed effects estimate larger, noisier, but also less stable trends which are usually similar in sign and significance to those using spatial-industry fixed effects. As a result, the main paper has given preference to these more conservative, better behaved estimates.

3.3 Weighted Spatial Fixed Effects

The spatial fixed effect estimator compares employment in a town to the average across all towns within some radius of it. However, while introspection may provide some guidance as to the proper choice of radius, any choice will remain somewhat ad hoc. Finite data sets do require that spatial bandwidths are not arbitrarily small, and researchers face a trade-off between greater power through more observations per fixed effect, and greater

specificity through increasingly local fixed effects. Therefore, a sensitivity analysis is desirable to see whether the identified results are sensitive to different assumptions on the form of the heterogeneity.

A pragmatic approach to identifying spatial discontinuities would ask how estimates change as we change the weight which we put on observations which are at different distances in controlling for local heterogeneity. To formalize this, consider several sets $R_g(m)$, each of which contains towns within some radius R_g of town m , where $g = 1, \dots, G$ and $R_G(m)$ is the largest potential radius for the spatial similarity. One solution is to simply difference off a weighted mean

$$Y_{imt} - \sum_g \frac{\rho_g}{n_{R_g(m)}} \sum_{m' \in R_g(m), t'} Y_{im't'} = \beta \left(Z_{imt} - \sum_g \frac{\rho_g}{n_{R_g(m)}} \sum_{m' \in R_g(m), t'} Z_{im't'} \right) + \nu_{imt} - \sum_g \frac{\rho_g}{n_{R_g(m)}} \sum_{m' \in R_g(m), t'} \nu_{im't'} + \delta_t - \sum_g \frac{\rho_g}{n_{R_g(m)}} \sum_{m' \in R_g(m), t'} \delta_{t'}$$

If, in the true spatial process $E[\nu_{imt} | Z_{iR_G(m)t'}] = \sum_{g=1}^G \rho_g E[\nu_{im't} | Z_{iR_G(m)}]$ for $m'_g \in R_g(m)$ and where $\sum_g \rho_g = 1$, then the conditional expectation of the ν_{imt} is equal to the properly weighted conditional expectations of spatial heterogeneity in nearby observations, allowing consistent identification of β . Of course, we don't know the relative weights. However, for robustness analysis, we can choose a few rings, and solve this equation for a relatively fine grid of all possible weights over those rings. Then, we can infer whether coefficient estimates and statistical inference would be robust to a wide variety of assumptions on the spatial heterogeneity⁵.

⁵An alternate approach would treat the ρ_g as parameters to be estimated, for example selecting the ρ_g which minimize the sum of squared error terms. In practice, putting the full weight on the most local ring always minimizes the sum of squared errors in this exercise. In the limit, this collapses to the town-industry

The Weighted Spatial Fixed Effect approach uses the fact that observations can be ordered by spatial proximity to difference off weighted means. Rather than subtracting off an evenly weighted spatial fixed effect, the weighted spatial fixed effect approach differences off a weighted mean, where different weights are allowed at different distances. Since the goal of this approach is to illustrate that estimates are robust to a wide variety of spatial weights, I choose three different radii and subtract off means at every possible set of weights.

Specifically, I assume there are three different rings to the heterogeneity, relevant at 5, 30, and 50 miles from the source observation. I present figures depicting the coefficient estimate and t-statistics at every possible .01 weight for each of these rings for the specification of employment and small firm employment. I further restrict all weights to be weakly positive, and $\rho_5 + \rho_{30} + \rho_{50} = 1$. In each picture, the vertical (Y) axis represents the dependent variable, while the Z-axis represents the relative weight (out of 100) on the 5-mile fixed effect, and the X-axis represents the relative weight on the 30-mile fixed effect. Therefore, the evaluation at (0,0) represents the coefficient estimate or t-statistic resulting from a 50-mile spatial fixed effect, the evaluation at (100,0) represent the evaluation with a 5-mile fixed effect, the point (0,100) represents the evaluation with a 30-mile fixed effect, and interior points feature weighted fixed effects. Figure 5 part (a) reveals that coefficient estimates of the effect of bargaining councils on employment are very stable to spatial heterogeneity, ranging from about a 7% to an 8% effect (these effects get larger as town or town-year fixed effects are included). Moreover, Figure 5 (b) reveals that they are statistically significant whenever the

fixed effects employed earlier, suggesting that we may prefer these estimates. In this paper, I take the robustness approach as the comparability between spatial and intertemporal estimates has been a strength of the analysis, and I illustrate that the effects highlighted here are robust to a wide variety of potential spatial weights.

spatial heterogeneity is sufficiently local. In other words, if the full weight is at the broadest 50 mile radius, conventional significance thresholds are not reached, but when the weighted fixed effects put most of the weight on 5 or 30 mile thresholds, we can reject a 0 effect. Since we may prefer the most local comparisons for both philosophical and pragmatic reasons (the data also prefer more local fixed effects, with sums of squared residuals minimized with the full weight on the 5 mile threshold), this provides strong support to the model. Figure 6 performs similar robustness calculations for small firm employment. Here, point estimates range from about 7% to 12% depending on the spatial heterogeneity, and point estimates are always statistically significant. While not presented here, including town-year fixed effects produces coefficient estimates which are larger in magnitude and extremely stable across the range of potential spatial heterogeneity for both employment and small firm employment, and they are always statistically significant regardless of the spatial weights. The weighted spatial fixed effects thus illustrate that the spatial discontinuity emphasized here is robust to a wide variety of assumptions on the form of spatial heterogeneity.

Table 1: First Stage Estimates

Fixed Effects Level	(1)	(2)	(3)	(4)
None	0.783*** (0.069)	0.851*** (0.052)	0.769*** (0.053)	0.760*** (0.077)
Town	0.815*** (0.056)	0.860*** (0.053)	0.797*** (0.060)	0.814*** (0.061)
Town-Year	0.799*** (0.052)	0.819*** (0.048)	0.747*** (0.055)	0.789*** (0.060)
Town-Indus	0.926*** (0.038)	0.955*** (0.039)		0.912*** (0.045)
Sample	Full	Wage	Wage	DC-Ratio
N	5048	2728	2728	3631
Radius	30	30	50	30

Notes

- 1 Presents first stage estimates of the effect of bargaining council eligibility on bargaining council status
- 2 Rows indicate the fixed effects used, in addition to spatial fixed effects which are measured at the radius indicated
- 4 Errors are clustered within the industry over space and time and among all industries, towns, and years in a given District Council
- 5 The DC-Ratio Sample is restricted to town-industry observations which represent less than 20% of the employment in that industry in that District Council on average

Table 2: Additional Summary Statistics on Bargaining Councils

Furniture Manufacturing				
	2000	2001	2002	2003
Magisterial Districts with a BC	222	222	130	222
Magisterial Districts with a new BC		0	0	92
Magisterial Districts which lose a BC		0	92	0
mean unionization rate	20.34%	27.30%	22.56%	21.25%
Total Magisterial Districts	329	329	329	329
Construction				
Magisterial Districts with a BC	70	102	44	44
Magisterial Districts with a new BC		58	0	0
Magisterial Districts which lose a BC		26	58	0
mean unionization rate	9.52%	12.79%	8.56%	9.43%
Total Magisterial Districts	329	329	329	329
Retail Trade				
Magisterial Districts with a BC	15	61	61	61
Magisterial Districts with a new BC		46	0	0
Magisterial Districts which lose a BC		0	0	0
mean unionization rate	6.54%	7.09%	9.73%	7.96%
Total Magisterial Districts	329	329	329	329
Hotels and Restaurants				
Magisterial Districts with a BC	31	32	32	32
Magisterial Districts with a new BC		1	0	0
Magisterial Districts which lose a BC		0	0	0
mean unionization rate	11.08%	11.08%	10.30%	6.92%
Total Magisterial Districts	329	329	329	329

Table 3: Wage Effects: Employee Composition Controls

Dependent Variable	(1) Wage	(2) Male	(3) Education	(4) Age	(5) Black	(6) Tenure
Fixed Effects Level						
None	0.146*** (0.048)	0.075*** (0.016)	-0.151 (0.146)	-0.243 (0.790)	-0.035 (0.033)	0.192*** (0.054)
Town	0.140*** (0.055) ⁺	0.090*** (0.023)	-0.239 (0.140)	-0.901 (0.940)	-0.011 (0.016)	0.188** (0.082)
Town-Year	0.079*** (0.026)	0.126*** (0.039)	-0.193 (0.189)	-1.213 (1.131)	-0.019 (0.015)	0.112 (0.071)
Town-Indus	0.085*** (0.030)	0.040** (0.019)	-0.259*** (0.073)	-0.741 (0.821)	0.007 (0.018)	0.179** (0.072)
Radius	50	50	50	50	50	50
Sample	wage	wage	wage	wage	wage	tenure
N	2728	2728	2728	2728	2728	2527

Notes

- 1 Presents IV coefficients of Bargaining Councils on mean log wages, the fraction male, mean education, age, the fraction black, and log tenure, with analysis restricted to observations with at least one wage (wage sample) or tenure (tenure sample) observation.
- 2 Rows consider different fixed effects.
- 3 Bargaining Council (BC) status is instrumented with BC eligibility; a magisterial district-industry is BC-eligible if at least one magisterial district in the same district council has a BC in that industry.
- 4 All specifications are conditional on 50-mile spatial-industry and time fixed effects, a quartic in log population, and worker composition variables.
- 5 All errors are clustered within the industry over space and time and among all industries, towns, and years in a given district council.
- 6 The ⁺ standard error is the maximum error from clustering either only among space or within district councils as the estimated variance was negative (following Cameron, Gelbach, and Miller 2006)

Table 4: Employment Effects: Spatial-Industry-Year FEs

	(1)	(2)	(3)	(4)	(5)
Dependent Variable	Employment	Large Firm	Small Firm	Self	Single Firm
Fixed Effects Level	Employment	Employment	Employment	Employment	Employment
None	-0.087 (0.111)	0.105 (0.092)	-0.260** (0.118)	-0.211* (0.116)	-0.136 (0.124)
Town	-0.191* (0.110)	-0.099 (0.098)	-0.327*** (0.105)	-0.327*** (0.110)	-0.124 (0.119)
Town-Year	-0.237* (0.138)	-0.118 (0.108)	-0.372*** (0.114)	-0.358*** (0.114)	-0.173 (0.116)
Town-Indus	0.000 (0.155)	-0.019 (0.231)	-0.143 (0.169)	-0.090 (0.091)	0.145 (0.097)
N	5048	5048	5048	5048	5048

Notes

- 1 Presents IV coefficients of Bargaining Councils on mean log employment and log employment by firm size.
- 2 Rows consider different fixed effects.
- 3 Bargaining Council (BC) status is instrumented with BC eligibility; a magisterial district-industry is BC-eligible if at least one magisterial district in the same district council has a BC in that industry.
- 4 All specifications are conditional on 30-mile spatial-industry-year fixed effects and a quartic in log population.
- 5 All errors are clustered within the industry over space and time and among all industries, towns, and years in a given district council.

Table 5: Wage Effects: Spatial-Industry-Year FEs

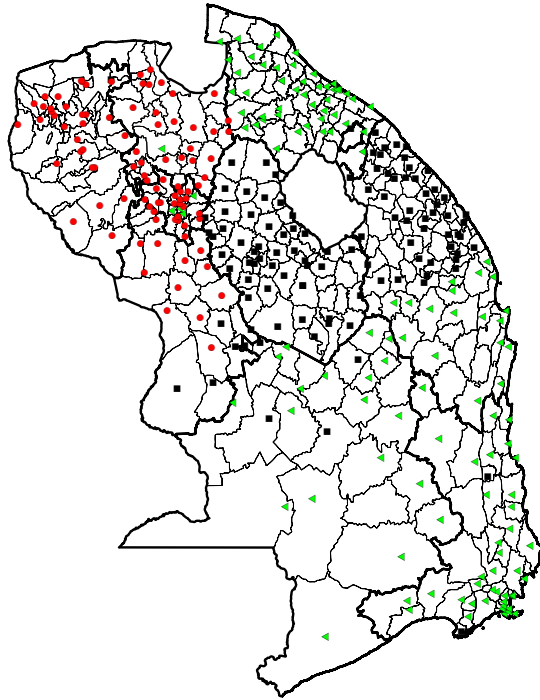
	(1)	(2)	(3)	(4)	(5)
	Wage	Wage	Small Firm Wage	Large Firm Wage	Wage
None	0.347*** (0.082)	0.347*** (0.082)	0.297** (0.129)	0.350*** (0.086)	0.193*** (0.070)
Town	0.179 (0.153)	0.335*** (0.058)	0.285* (0.156)	0.057 (0.258)	0.208*** (0.069)
Town-Year	0.204 (0.188)	0.188** (0.074)	0.268 (0.172)	0.029 (0.201)	0.082 (0.073)
Town-Indus	0.232 (0.293)		0.550 (0.404)	-0.044 (0.310)	0.044 (0.255)
Radius	30	50	50	50	50
Sample	Wage	Wage	Small Wage	Large Wage	Wage
Controls?	No	No	No	No	Yes
N	2728	2728	2261	1260	2728

Notes

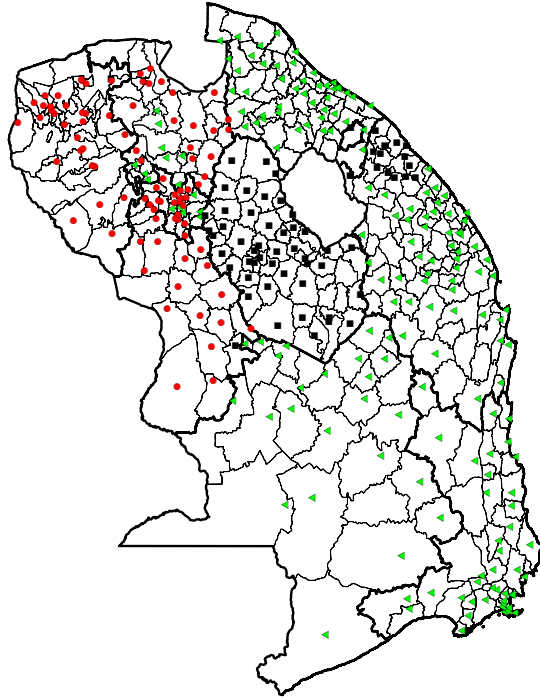
- 1 Presents coefficients of Bargaining Councils on mean log wages, and mean log wages in small or large firms.
- 2 Rows consider different fixed effects.
- 3 Bargaining Council (BC) status is instrumented with BC eligibility; a magisterial district-industry is BC-eligible if at least one magisterial district in the same district council has a BC in that industry.
- 4 Results are conditional on spatial-industry-year (with a radius given in the radius row) fixed effects, and a quartic in log population.
- 5 All errors are clustered within the industry over space and time and among all industries, towns, and years in a given district council.
- 6 Controls column features the fraction male, fraction black, mean education, and a quadratic in mean experience

Figure 1: Furniture Manufacturing Bargaining Councils

(a) Actual Bargaining Council Status



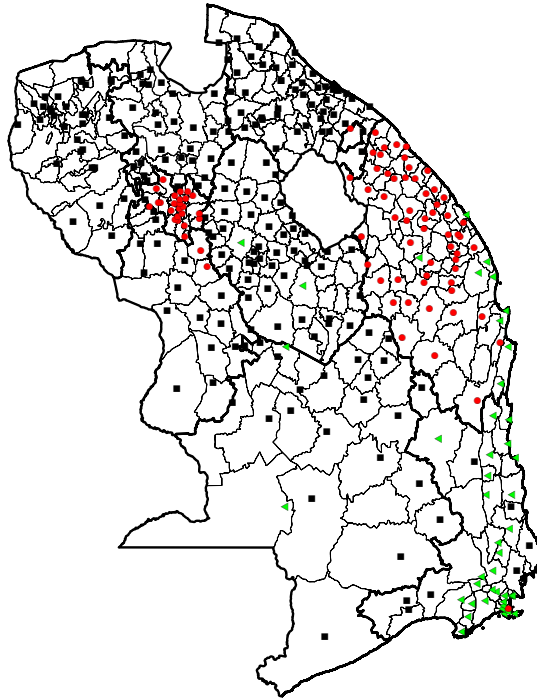
(b) Instrumented Bargaining Council Status



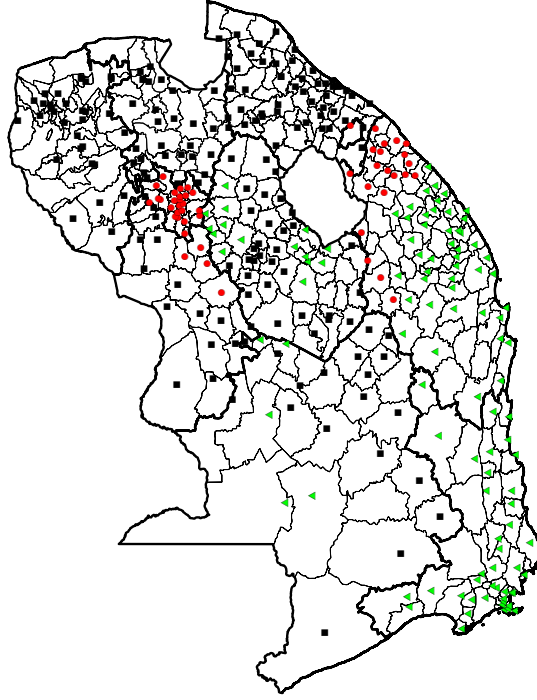
Green triangles indicate magisterial districts that always have furniture manufacturing bargaining councils over the period 2000-2003, red circles indicate magisterial districts which sometimes do, and black squares indicate magisterial districts which never have bargaining councils in furniture manufacturing.

Figure 2: Construction Bargaining Councils

(a) Actual Bargaining Council Status



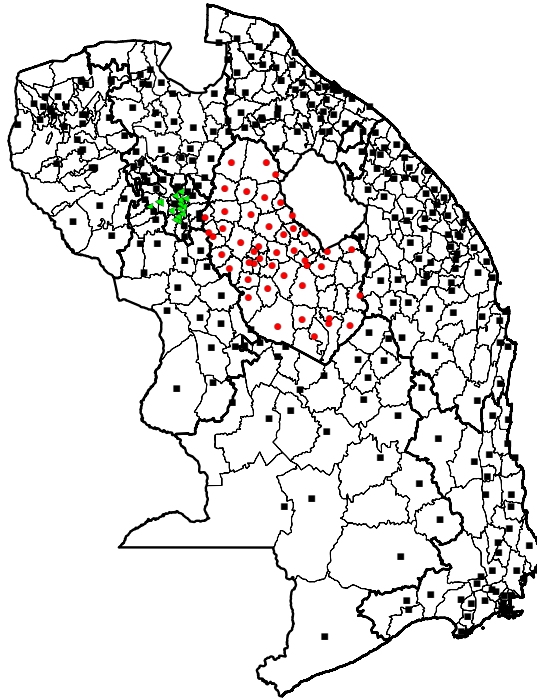
(b) Instrumented Bargaining Council Status



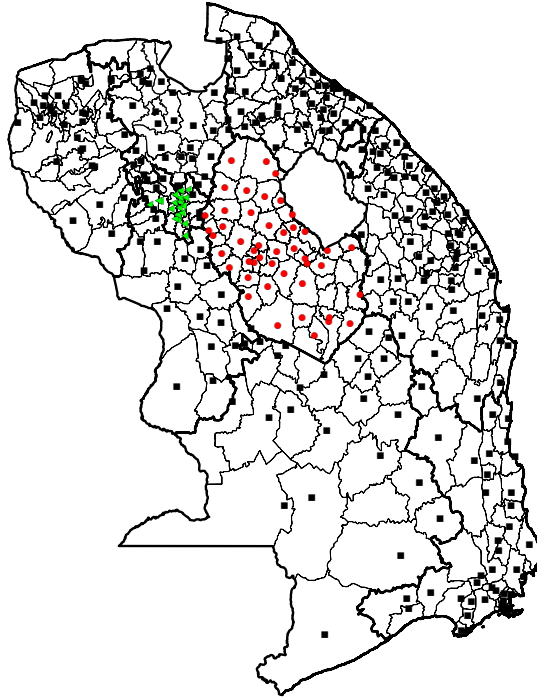
Green triangles indicate magisterial districts that always have construction bargaining councils over the period 2000-2003, red circles indicate magisterial districts which sometimes do, and black squares indicate magisterial districts which never have bargaining councils in construction.

Figure 3: Retail Trade Bargaining Councils

(a) Actual Bargaining Council Status



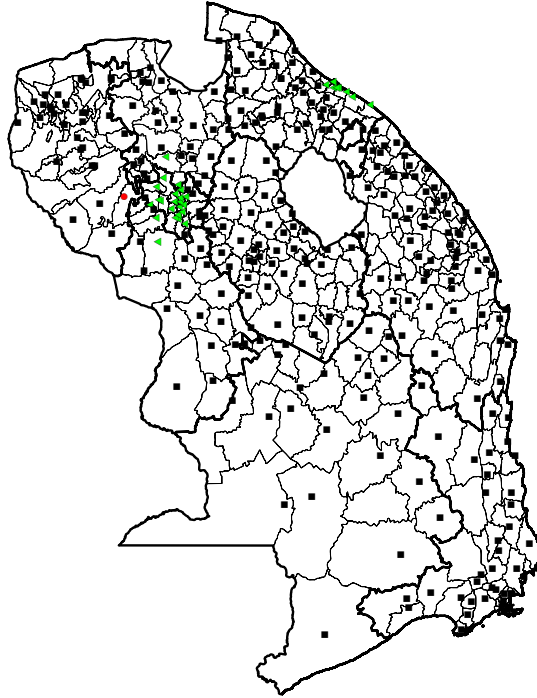
(b) Instrumented Bargaining Council Status



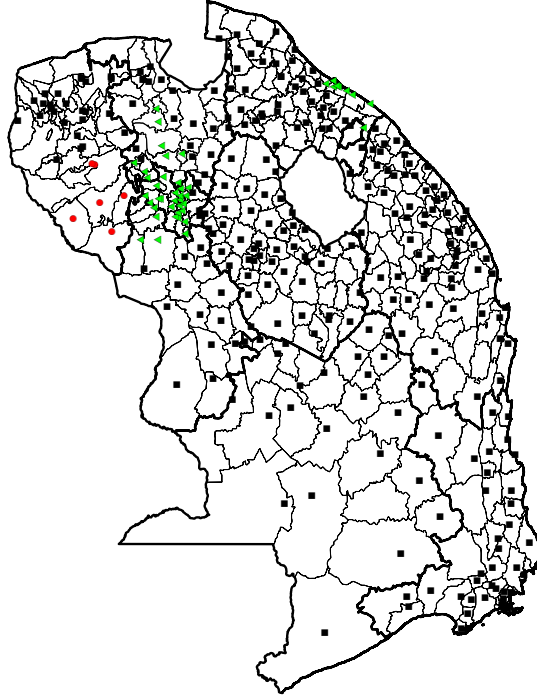
Green triangles indicate magisterial districts that always have retail trade bargaining councils over the period 2000-2003, red circles indicate magisterial districts which sometimes do, and black squares indicate magisterial districts which never have bargaining councils in retail trade.

Figure 4: Hotels and Restaurants Bargaining Councils

(a) Actual Bargaining Council Status



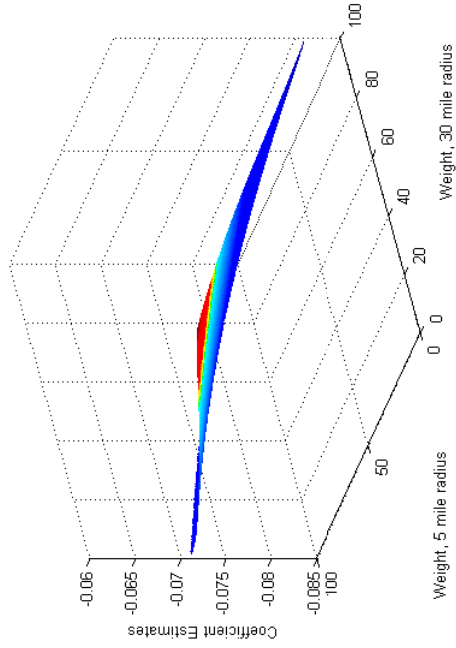
(b) Instrumented Bargaining Council Status



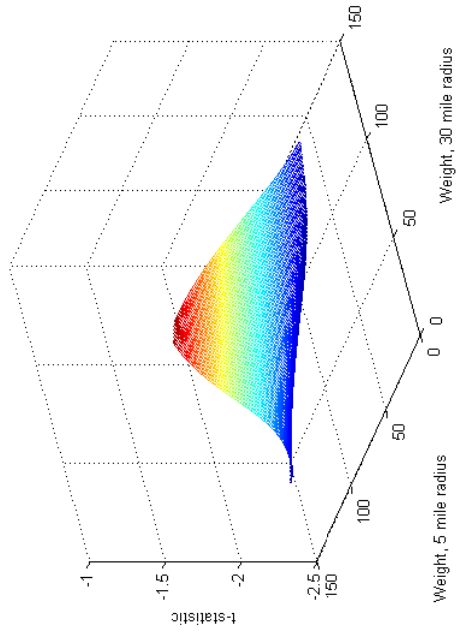
Green triangles indicate magisterial districts that always have hotels and restaurants bargaining councils over the period 2000-2003, red circles indicate magisterial districts which sometimes do, and black squares indicate magisterial districts which never have bargaining councils in hotels and restaurants.

Figure 5: Employment Estimates: Flexible Spatial Heterogeneity

(a) Coefficient Estimates



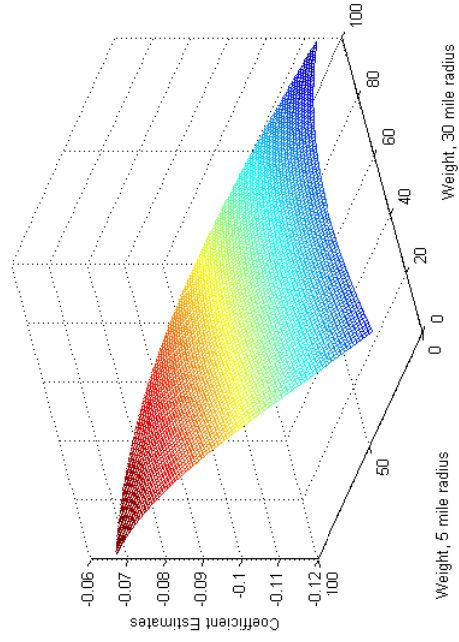
(b) t-statistics



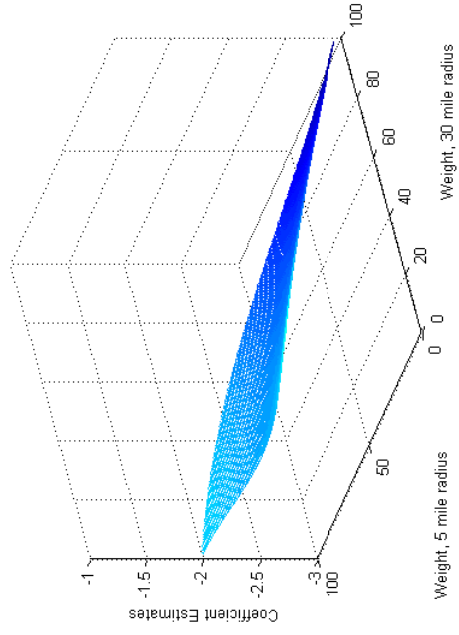
Presents Coefficient estimates of bargaining council status and t-statistics where relative weights of nearby observations within 5, 30, and 50 miles are allowed to vary. Bargaining council status is instrumented with bargaining council eligibility as above.

Figure 6: Small Firm Employment Estimates: Flexible Spatial Heterogeneity

(a) Coefficient Estimates



(b) t-statistics



Presents Coefficient estimates and t-statistics of bargaining council status on small firm employment where relative weights of nearby observations within 5, 30, and 50 miles are allowed to vary. Bargaining council status is instrumented with bargaining council eligibility as above.