THE FLIGHT OF WHITE-COLLARS: CIVIL CONFLICT, AVAILABILITY OF MEDICAL SERVICE PROVIDERS AND PUBLIC HEALTH

ONLINE APPENDIX

A5.1 The Analyses

Chart A1: Frequency distributions of health professional counts.

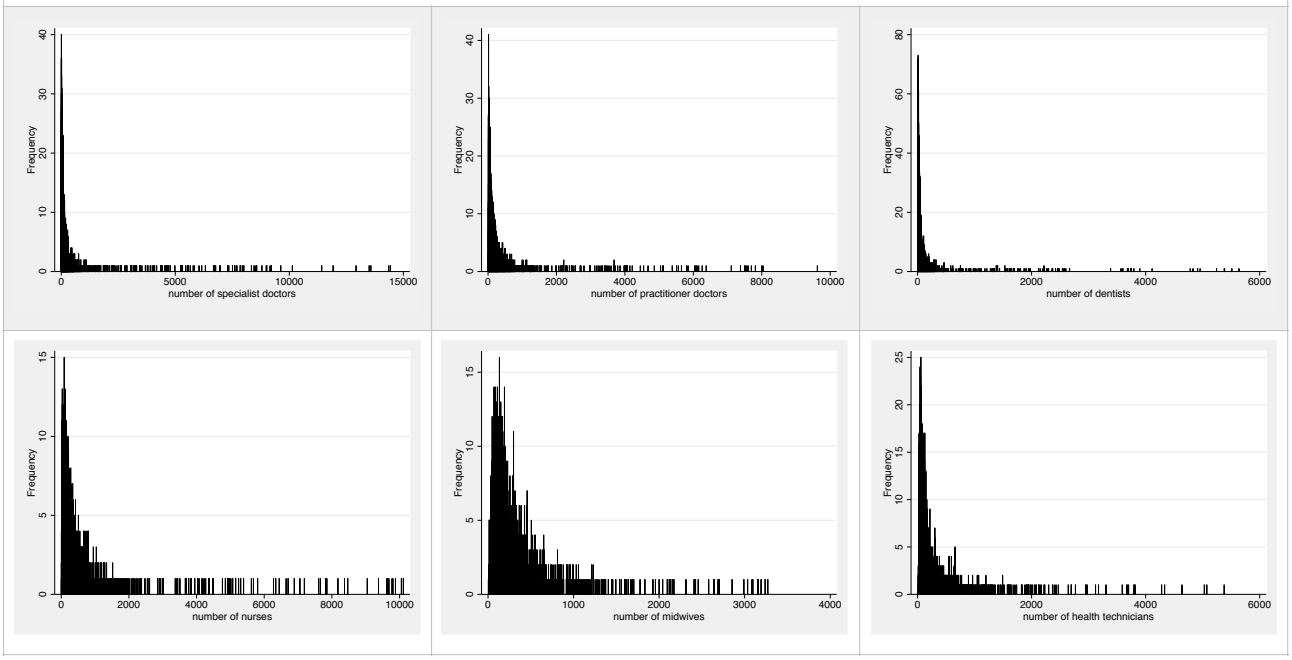


Chart A1 above plots the frequency distributions of our dependent variables in the base model. As can be seen, these are highly skewed, over-dispersed count variables which only take strictly positive integer values. Thus, their distribution can be modelled as negative binomial.

Table A1 below presents the estimated average marginal effects from the base model.

Table A1: Results of the negative binomial regressions - Base model
Estimated coefficients are average marginal effects (AME) which give the expected average change in the dependent variable in response to an infinite-small change in the control variable.

Dependent variable:	Number of specialist doctors	Number of specialist doctors	Number of practitioner doctors	Number of practitioner doctors	Number of dentists	Number of dentists
Independent Variables						
Number of SF casualties in previous year	0.1221*** (-8.62)	-0.05*** (-2.81)	-0.055*** (-5.55)	-0.046*** (-3.35)	-0.047*** (-4.37)	-0.014 (-1.40)
Population in 10 thousands	-0.0068*** (-4.93)	-0.0044 (1.57)	-0.0087*** (-5.78)	-0.002 (-0.91)	0.0015* (1.73)	0.006*** (4.92)
GDP per capita in constant prices		0.0004*** (5.41)		0.0001 (1.51)		0.0002*** (6.50)
Province and year dummies	Not reported, available upon request.					
Number of observations	3175	1927	3177	1927	3171	1926
Log likelihood	-14545	-8207	-15238	-8963	-12592	-7702

***: significant at 1% level; **: significant at 5% level. z-values in parenthesis

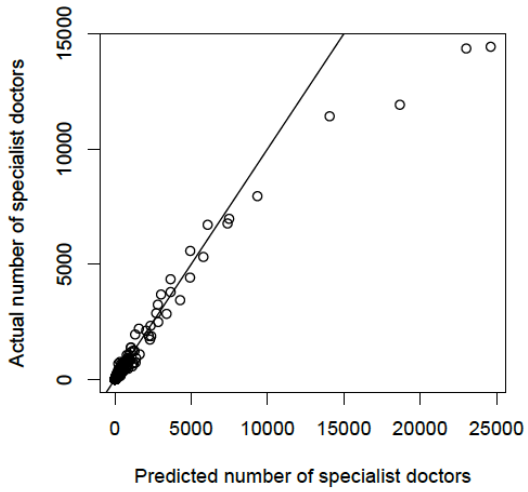
Table A1-continued: Results of the negative binomial regressions - Base model
Reported coefficients are average marginal effect (AME) which give the expected average change in the dependent variable in response to an infinite-small change in the control variable.

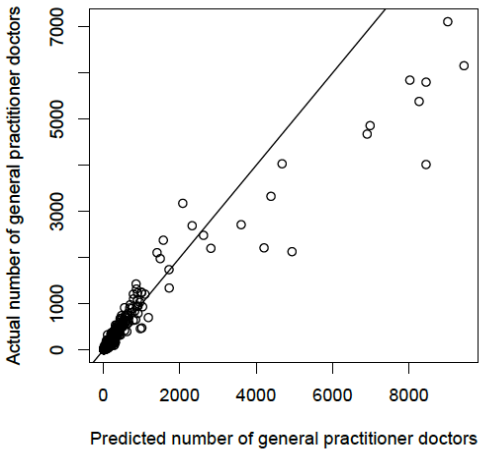
Dependent variable:	Number of nurses	Number of nurses	Number of midwives	Number of midwives	Number of health technicians	Number of health technicians	Total number of medical personnel	Total number of medical personnel
Independent Variables								
Number of SFCs in previous year	-0.032*** (-2.59)	-0.051*** (-2.76)	-0.07*** (-5.84)	-0.102*** (-5.73)	0.006 (0.67)	0.014 (1.07)	-0.036*** (-2.95)	I-0.058*** (3.10)
Population in ten thousands	0.012*** (6.17)	0.025*** 7.74)	0.015*** (8.94)	0.024*** (8.68)	-0.004** (2.10)	-0.014*** (4.01)	0.006*** (2.61)	0.011*** (3.04)
GDP per capita in constant prices		0.0008*** (9.34)		0.0005*** (7.79)		-0.00 (-0.53)		0.0007*** (7.25)
Province and year dummies	Not reported, available upon request.							
Number of observations	2693	1847	2693	1847	2692	1847	2682	1846
Log likelihood	-13771.69	-9515.32	-13797.79	-9395.08	-13045.89	-8759.75	-16702.32	-11.338.44
AIC	27623.38	19088.64	27675.59	18848.17	26171.79	17577.51	33484.64	22734.87
BIC	27859.32	19248.76	27911.53	19008.28	26407.71	17737.63	33720.43	22894.98

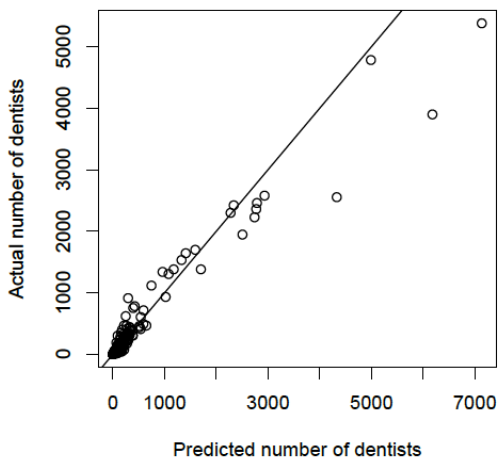
***: significant at 1% level; **: significant at 5% level. z-values in parenthesis

Chart A2 below plots the results of the two-fold cross validation tests we conducted to test the predictive performance of our base model. To conduct the tests we have randomly set aside 20 percent of the observations, and fit the model on the remaining 80 percent. Then we used the observations we had excluded as a test bed to see how accurately our model can predict them. As can be seen, the fit between predicted values and actual observations is really good for all dependent variables.

Chart A2: Goodness of Fit. Predicted vs. Actual Values - Base Model







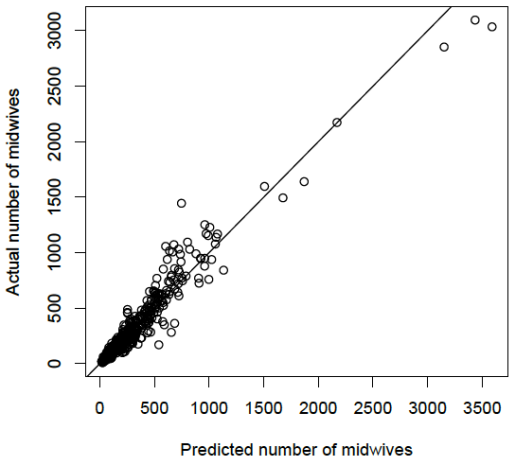
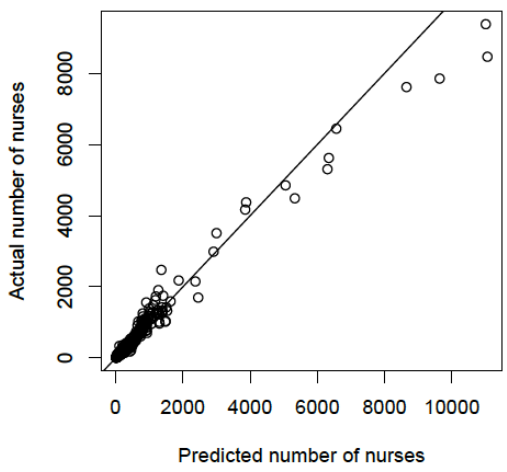
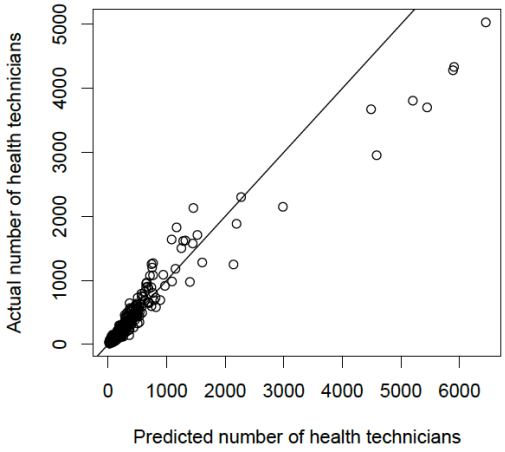


Chart A2 - continued: Goodness of Fit. Predicted vs. Actual Values - Base Model





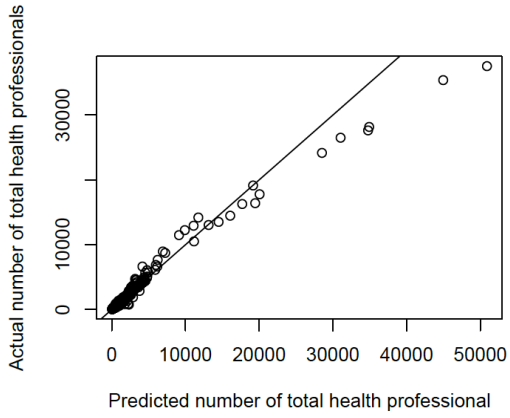


Table A2 below presents the results we get when we log transform our count dependent variables and estimate a linear version of our base model with OLS. As can be seen these OLS results are very similar to our original negative binomial regression results. The reported coefficients are the exponentials of the estimated coefficients of the linear model.

Table A2: OLS results. OLS regressions are conducted with log transformed dependent variables. Exponentials of the estimated coefficients (EEC) of the linear model are reported.

Dependent variable: / Independent Variables	Number of specialist doctors	Number of specialist doctors	Number of general practitioner doctors	Number of general practitioner doctors	Number of dentists	Number of dentists
Number of SFCs in previous year	0.997*** (-4.10)	0.997*** (-3.05)	0.995*** (-6.40)	0.997*** (-4.12)	0.995*** (-6.13)	0.997*** (-2.58)
Population in ten thousands	0.999*** (-5.27))	0.999 (-1.15)	0.999*** (-5.42)	0.999 (-1.02)	1.000 (0.61)	1.000*** (3.60)
GDP per capita in constant prices		1.000*** (2.21)		1.000*** (2.46)		1.000*** (6.27)
Province dummies	Not reported, available upon request.					
Year dummies	Not reported, available upon request.					
Number of observations	3175	1928	3177	1928	3171	3171
Goodness of fit	R-square within:0.8527 between: 0.0527 overall:0.1797	R-square within:0.7342 between: 0.0157 overall:0.0904	R-square within:0.9006 between: 0.0113 overall:0.4312	R-square within:0.8863 between: 0.0040 overall:0.3541	R-square within:0.8016 between: 0.0175 overall:0.2257	R-square within:0.4398 between: 0.3341 overall:0.35

***: significant at 1% level; **: significant at 5% level. z-values in parenthesis

Table A2-continued: OLS results. OLS regressions are conducted with log transformed dependent variables. Exponentials of the estimated coefficients (EEC) of the linear model are reported.

Dependent variable: / Independent Variables	Number of nurses	Number of nurses	Number of midwifes	Number of midwifes	Number of health technicians	Number of health technicians	Total number of medical personnel	Total number of medical personnel
Number of SFCs in previous year	0.998*** (-2.88)	0.999* (-1.61)	0.996*** (5.88)	0.997*** (-5.37)	1.000 (0.10)	1.001** (2.08)	0.998*** (4.37)	0.999*** (-3.42)
Population in ten thousands	1.000*** (3.14)	1.000*** (7.31)	1.001*** (6.90)	1.001*** (8.99)	0.999 (-0.61)	0.999*** (-3.85)	1.000 (1.20)	1.000*** (3.42)
GDP per capita in constant prices		1.000*** (10.16)		1.000*** (8.00)		0.999 (-0.97)		1.000*** (7.73)
Province dummies	Not reported, available upon request.							
Year dummies	Not reported, available upon request.							
Number of observations	2693	1848	2693	1848	2692	1848	2682	1847

Table A2-continued: OLS results. OLS regressions are conducted with log transformed dependent variables. Exponentials of the estimated coefficients (EEC) of the linear model are reported.								
Dependent variable: / **Independent Variables**	**Number of nurses**	**Number of nurses**	**Number of midwifes**	**Number of midwifes**	**Number of health technicians**	**Number of health technicians**	**Total number of medical personnel**	**Total number of medical personnel**
Goodness of fit	R-square within: 0.9289 between: 0.0169 overall: 0.4334	R-square within: 0.8502 between: 0.0770 overall: 0.3570	R-square within: 0.8515 between: 0.0150 overall: 0.4294	R-square within: 0.7800 between: 0.1098 overall: 0.4327	R-square within: 0.8527 between: 0.0308 overall: 0.3252	R-square within: 0.8635 between: 0.1555 overall: 0.1811	R-square within: 0.9314 between: 0.0289 overall: 0.3322	R-square within: 0.9043 between: 0.0020 overall: 0.2693
***: significant at 1% level; **: significant at 5% level. z-values in parenthesis								

A5.2. Availability of Medical Personnel and Public Health

To provide further evidence that the availability of medical personnel is an important mechanism through which civil conflicts hurt public health we estimate the following linear model using a Tobit regression analysis:

$$Z_{i,t} = \alpha + \beta_1 \hat{Y}_{i,t} + \beta_2 X_{i,t} + \beta_3 T + \beta_4 P + u_{i,t}$$

where $Z_{i,t}$ will be the percentage of births unattended by medical personnel, and BCG vaccination rates among new borns in province i, in year t respectively. $\hat{Y}_{i,t}$ is the number of medical personnel that our base model predicts in province i in year t; X_{it} is the population of province p in year t in ten thousands; T is a vector of year dummies controlling for the time trend and other time specific effects; P is a vector of province dummies controlling for province specific effects. We estimate the model with the inclusion of GDP in constant prices across provinces as well. Table A3 below presents the results.

Table A3: Results of the Tobit regressions on births unattended by medical professionals and BCG vaccination rates (Bootstrapped errors)				
Dependent variable:	**Percentage of births unattended by medical professionals**		**Percentage of BCG vaccination rates among new borns**	
Independent Variables				
Number of predicted midwives+	-0.024*** (-4.85)	-0.015*** (-2.14)	0.021 (0.92)	0.019 (0.13)
GDP per capita at constant prices		-0.001*** (-6.09)		0.001* (1.92)
Population in ten thousands	0.029 (1.62)	0.002 (0.05)	-0.019 (-0.47)	0.001 (0.02)
Year and province dummies	not reported, available upon request			
Number of observations	1585	965	1037	632
Log likelihood	-5162.75	-3091.70	-3737.81	-2029.16
AIC	10553.51	6383.40	7573.62	4116.32
BIC	11165.5	6870.61	7815.88	4245.34
***: significant at 1% level; **: significant at 5% level; *:significant at 10% level. z-values in parenthesis.				
+: In Turkey, births and new born care, are attended by midwives unless medical complications arise.				

The estimated coefficients indicate that the number of midwives which we predict as a function of conflict intensity is negatively associated with the percentage of births unattended by medical personnel. These results provide further support to our claim that the flight of medical personnel away from conflict areas is one important mechanism through which civil conflicts hurt public health in host societies.

Note that even though their signs indicate a positive association between the predicted number of midwives and vaccination rates the estimated coefficients for the BCG vaccination rates lack statistical significancy. We believe the lack of statistical significancy stems from the limited time scope of our data on this public health indicator. Unfortunately our data on BCG vaccination rates is limited to the 1996-2006 period, in other words, it is not as rich as our data on percentage of

births unattended by medical personnel. Moreover, because vaccinations can be administered by most medical personnel, rates may not be as responsive as more specialized tasks as attending births.