Income Inequality Homework 1

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```
##  [1] year          X             perwt         age           ind90ly
##  [6] wkswork2      uhrwork       incwage       stem.x        female
## [11] white         lbin          stem_perwt    nonstem_perwt stem.y
## [16] nonstem       z             hrs_week_ly
## <0 rows> (or 0-length row.names)
```

```
##   stem year ind90ly stem.x    year ind90ly    incwage
## 1    0 2008      10      0 2501968   12460 5227890410
## 2    1 2008      10    201  403608    2010  350335140
## 3    0 2009      10      0 2645853   13170 5742956050
## 4    1 2009      10    211  423899    2110  362689700
## 5    0 2010      10      0 2723550   13550 5627444090
## 6    1 2010      10    208  418080    2080  391133660
```

```
##   year wage_premium
## 1 2008    0.7144544
## 2 2009    0.6767983
## 3 2010    0.6783703
## 4 2011    0.6826020
## 5 2012    0.7178718
## 6 2013    0.6462313
```

```
## [1] 2.0067140 0.8864828 2.0953893 1.0547500 1.5397603 2.2424917
```

```
##   year  lbin     hours    incwage stem         z       DATE   GDPDEF
## 1 2008 66101   2196291   73828300    1 -3.046397 2008-01-01 94.28875
## 2 2008 26001  11199368  231419750    1 -3.046397 2008-01-01 94.28875
## 3 2008 26100 181834118 3916231640    0 -3.046397 2008-01-01 94.28875
## 4 2008 80011    251760    1264100    1 -3.046397 2008-01-01 94.28875
## 5 2008 46011  36648981 1243430500    1 -3.046397 2008-01-01 94.28875
## 6 2008 74111   3230359  163446540    1 -3.046397 2008-01-01 94.28875
##           inc    lnrinc  lnhours          y year_col year_col.f lbin.f
## 1   783002.21 13.570891 14.60228 -1.0313898    20081      20081  66101
## 2  2454372.87 14.713382 16.23137 -1.5179861    20081      20081  26001
## 3 41534452.84 17.542034 19.01861 -1.4765716    20080      20080  26100
## 4    13406.69  9.503509 12.43623 -2.9327224    20081      20081  80011
## 5 13187474.65 16.394778 17.41690 -1.0221181    20081      20081  46011
## 6  1733468.10 14.365635 14.98810 -0.6224692    20081      20081  74111
##   l_shifter wage_premium      supply
## 1 2.0067140    0.7144544   4407327.8
## 2 0.8864828    0.7144544   9928046.8
## 3 2.0953893    0.7144544 381013267.1
## 4 1.0547500    0.7144544    265543.9
## 5 1.5397603    0.7144544  56430644.1
## 6 2.2424917    0.7144544   7244053.4
```

```
##    year  lbin     hours     incwage stem         z       DATE   GDPDEF
## 3  2008 26100 181834118  3916231640    0 -3.046397 2008-01-01 94.28875
## 9  2008 64110 366777471 17745860480    0 -3.046397 2008-01-01 94.28875
## 11 2008 70000   8552406   220354200    0 -3.046397 2008-01-01 94.28875
```

```
## 12 2008 83010   3456783    57270550    0 -3.046397 2008-01-01 94.28875
## 14 2008 59110 739978531 33659164270    0 -3.046397 2008-01-01 94.28875
## 15 2008 78010   9286736   277812890    0 -3.046397 2008-01-01 94.28875
##            inc   lnrinc  lnhours          y year_col year_col.f lbin.f
## 3   41534452.8 17.54203 19.01861 -1.4765716    20080      20080  26100
## 9  188207612.0 19.05306 19.72027 -0.6672096    20080      20080  64110
## 11   2337014.8 14.66438 15.96172 -1.2973383    20080      20080  70000
## 12    607395.4 13.31694 15.05585 -1.7389137    20080      20080  83010
## 14 356979642.5 19.69319 20.42213 -0.7289424    20080      20080  59110
## 15   2946405.5 14.89610 16.04410 -1.1480011    20080      20080  78010
##    l_shifter wage_premium     supply
## 3   2.095389    0.7144544  381013267
## 9   4.491117    0.7144544 1647240435
## 11  2.704901    0.7144544   23133407
## 12  2.172196    0.7144544    7508812
## 14  4.605548    0.7144544 3408006693
## 15  2.664376    0.7144544   24743353
```

```
##   year       supply ln_supply_col0
## 1 2008 276057042199       26.34387
## 2 2009 276271188799       26.34465
## 3 2010 278892216825       26.35409
## 4 2011 288476634073       26.38788
## 5 2012 294466421675       26.40843
## 6 2013 301677217924       26.43262
```

```
##   year     supply ln_supply_col1
## 1 2008 6479853288       22.59196
## 2 2009 6360567994       22.57338
## 3 2010 7797929819       22.77712
## 4 2011 7757331930       22.77190
## 5 2012 8766767569       22.89423
## 6 2013 8628348746       22.87832
```

```
##   year ln_supply_col0 ln_supply_col1
## 1 2008       26.34387       22.59196
## 2 2009       26.34465       22.57338
## 3 2010       26.35409       22.77712
## 4 2011       26.38788       22.77190
## 5 2012       26.40843       22.89423
## 6 2013       26.43262       22.87832
```

```
##   year ln_supply_col0 ln_supply_col1 ln_rel_supp_coll
## 1 2008       26.34387       22.59196        -3.751910
## 2 2009       26.34465       22.57338        -3.771265
## 3 2010       26.35409       22.77712        -3.576967
## 4 2011       26.38788       22.77190        -3.615976
## 5 2012       26.40843       22.89423        -3.514197
## 6 2013       26.43262       22.87832        -3.554304
```

```
##   year ln_rel_supp_coll wage_premium         z
## 1 2008        -3.751910    0.7144544 -3.046397
## 2 2009        -3.771265    0.6767983 -3.058752
## 3 2010        -3.576967    0.6783703 -2.877204
## 4 2011        -3.615976    0.6826020 -2.918370
## 5 2012        -3.514197    0.7178718 -2.813112
```

```
## 6 2013        -3.554304    0.6462313 -2.850945
```

```
##   year ln_rel_supp_coll wage_premium         z t
## 1 2008        -3.751910    0.7144544 -3.046397 0
## 2 2009        -3.771265    0.6767983 -3.058752 1
## 3 2010        -3.576967    0.6783703 -2.877204 2
## 4 2011        -3.615976    0.6826020 -2.918370 3
## 5 2012        -3.514197    0.7178718 -2.813112 4
## 6 2013        -3.554304    0.6462313 -2.850945 5
```

```
##   year         s         w         z t
## 1 2008 -3.751910 0.7144544 -3.046397 0
## 2 2009 -3.771265 0.6767983 -3.058752 1
## 3 2010 -3.576967 0.6783703 -2.877204 2
## 4 2011 -3.615976 0.6826020 -2.918370 3
## 5 2012 -3.514197 0.7178718 -2.813112 4
## 6 2013 -3.554304 0.6462313 -2.850945 5
```

```
##
## Call:
## lm(formula = w ~ t + s, data = df_CM_complete)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.03307 -0.02404 -0.00507  0.02079  0.03653
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept) -0.020787   0.019257  -1.079    0.322
## t           -0.008845   0.006415  -1.379    0.217
## s            0.151096   0.181660   0.832    0.437
##
## Residual standard error: 0.02936 on 6 degrees of freedom
## Multiple R-squared:  0.2617, Adjusted R-squared:  0.01563
## F-statistic: 1.063 on 2 and 6 DF,  p-value: 0.4024
```

```
## Loading required package: AER
```

```
## Loading required package: car
```

```
## Loading required package: carData
```

```
## Loading required package: lmtest
```

```
## Warning: package 'lmtest' was built under R version 3.5.2
```

```
## Loading required package: zoo
```

```
##
## Attaching package: 'zoo'
```

```
## The following objects are masked from 'package:base':
##
##     as.Date, as.Date.numeric
```

```
## Loading required package: sandwich
```

```
## Warning: package 'sandwich' was built under R version 3.5.2
```

```
## Loading required package: survival
```

```
##
## Call:
## ivreg(formula = w ~ t + s | t + z, data = df_CM_complete)
##
## Residuals:
##       Min        1Q    Median        3Q       Max
## -0.033114 -0.024238 -0.004894  0.020876  0.036548
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept) -0.020876   0.019261  -1.084    0.320
## t           -0.008914   0.006421  -1.388    0.214
## s            0.153525   0.181940   0.844    0.431
##
## Residual standard error: 0.02936 on 6 degrees of freedom
## Multiple R-Squared: 0.2617,  Adjusted R-squared: 0.0156
## Wald test: 1.074 on 2 and 6 DF,  p-value: 0.3994
```

```
library(stargazer)
```

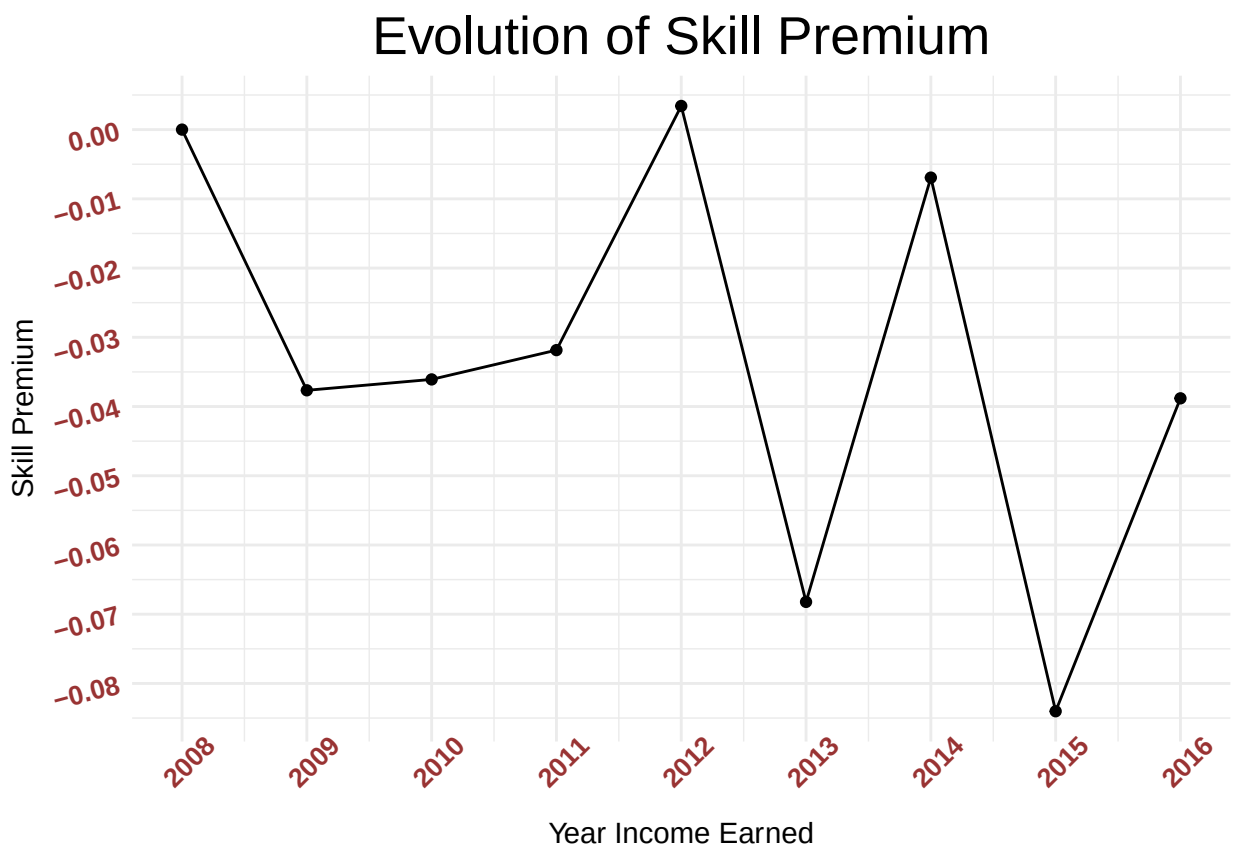
```
##
## Please cite as:
##  Hlavac, Marek (2018). stargazer: Well-Formatted Regression and Summary Statistics Tables.
##  R package version 5.2.2. https://CRAN.R-project.org/package=stargazer
```

```
stargazer(model_ols,model_iv,align=TRUE,title = "Canonical Model Analysis", no.space=TRUE)
```

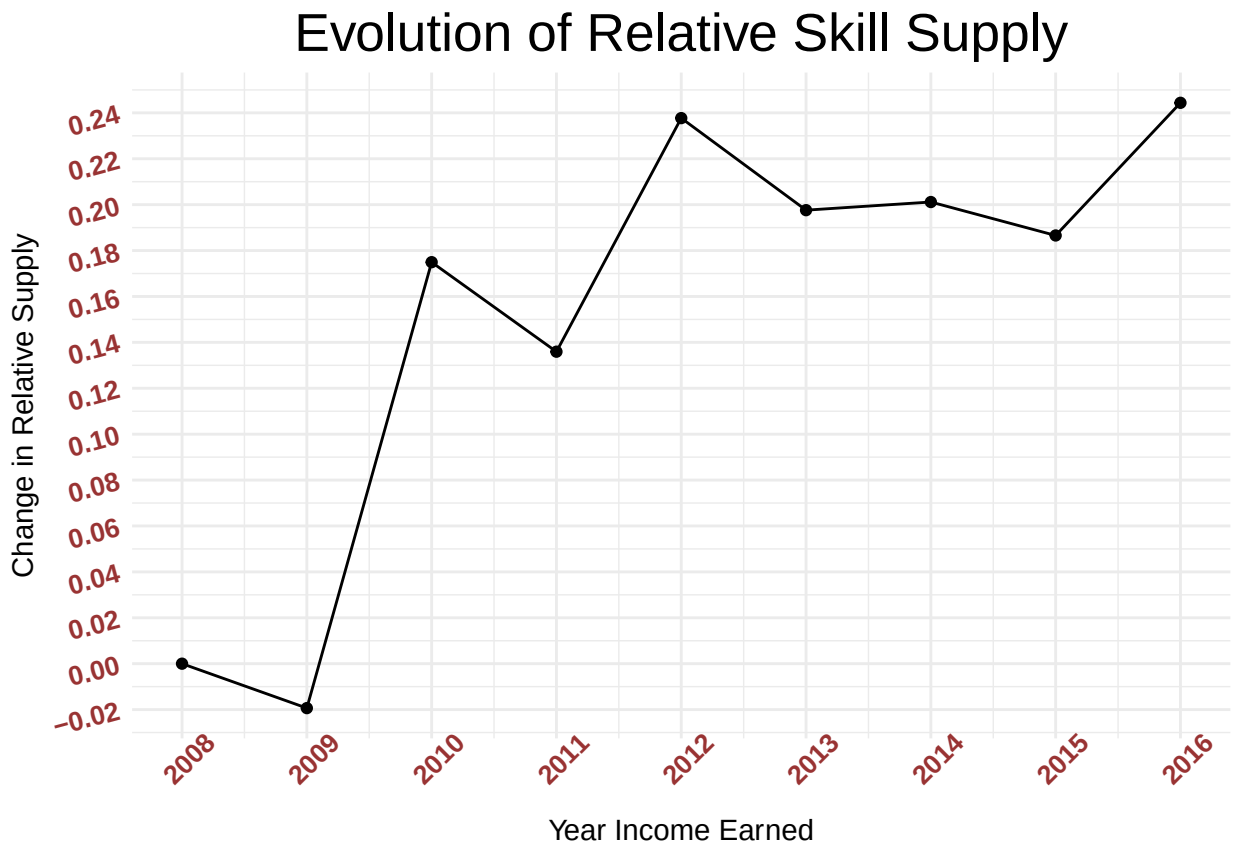
```
##
## % Table created by stargazer v.5.2.2 by Marek Hlavac, Harvard University. E-mail: hlavac at fas.harva
## % Date and time: Mon, Apr 22, 2019 - 5:19:54 PM
## % Requires LaTeX packages: dcolumn
## \begin{table}[!htbp] \centering
##   \caption{Canonical Model Analysis}
##   \label{}
## \begin{tabular}{@{\extracolsep{5pt}}lD{.}{.}{-3} D{.}{.}{-3} }
## \\[-1.8ex]\hline
## \hline \\[-1.8ex]
##  & \multicolumn{2}{c}{\textit{Dependent variable:}} \\
## \cline{2-3}
## \\[-1.8ex] & \multicolumn{2}{c}{w} \\
## \\[-1.8ex] & \multicolumn{1}{c}{\textit{OLS}} & \multicolumn{1}{c}{\textit{instrumental}} \\
##  & \multicolumn{1}{c}{\textit{}} & \multicolumn{1}{c}{\textit{variable}} \\
## \\[-1.8ex] & \multicolumn{1}{c}{(1)} & \multicolumn{1}{c}{(2)}\\
## \hline \\[-1.8ex]
##  t & -0.009 & -0.009 \\
##   & (0.006) & (0.006) \\
##   s & 0.151 & 0.154 \\
##   & (0.182) & (0.182) \\
##   Constant & -0.021 & -0.021 \\
##   & (0.019) & (0.019) \\
##  \hline \\[-1.8ex]
## Observations & \multicolumn{1}{c}{9} & \multicolumn{1}{c}{9} \\
## R$^{2}$ & \multicolumn{1}{c}{0.262} & \multicolumn{1}{c}{0.262} \\
## Adjusted R$^{2}$ & \multicolumn{1}{c}{0.016} & \multicolumn{1}{c}{0.016} \\
```

```
## Residual Std. Error (df = 6) & \multicolumn{1}{c}{0.029} & \multicolumn{1}{c}{0.029} \\
## F Statistic & \multicolumn{1}{c}{1.063 (df = 2; 6)} &  \\
## \hline
## \hline \\[-1.8ex]
## \textit{Note:}  & \multicolumn{2}{r}{$^{*}$p$<$0.1; $^{**}$p$<$0.05; $^{***}$p$<$0.01} \\
## \end{tabular}
## \end{table}
```

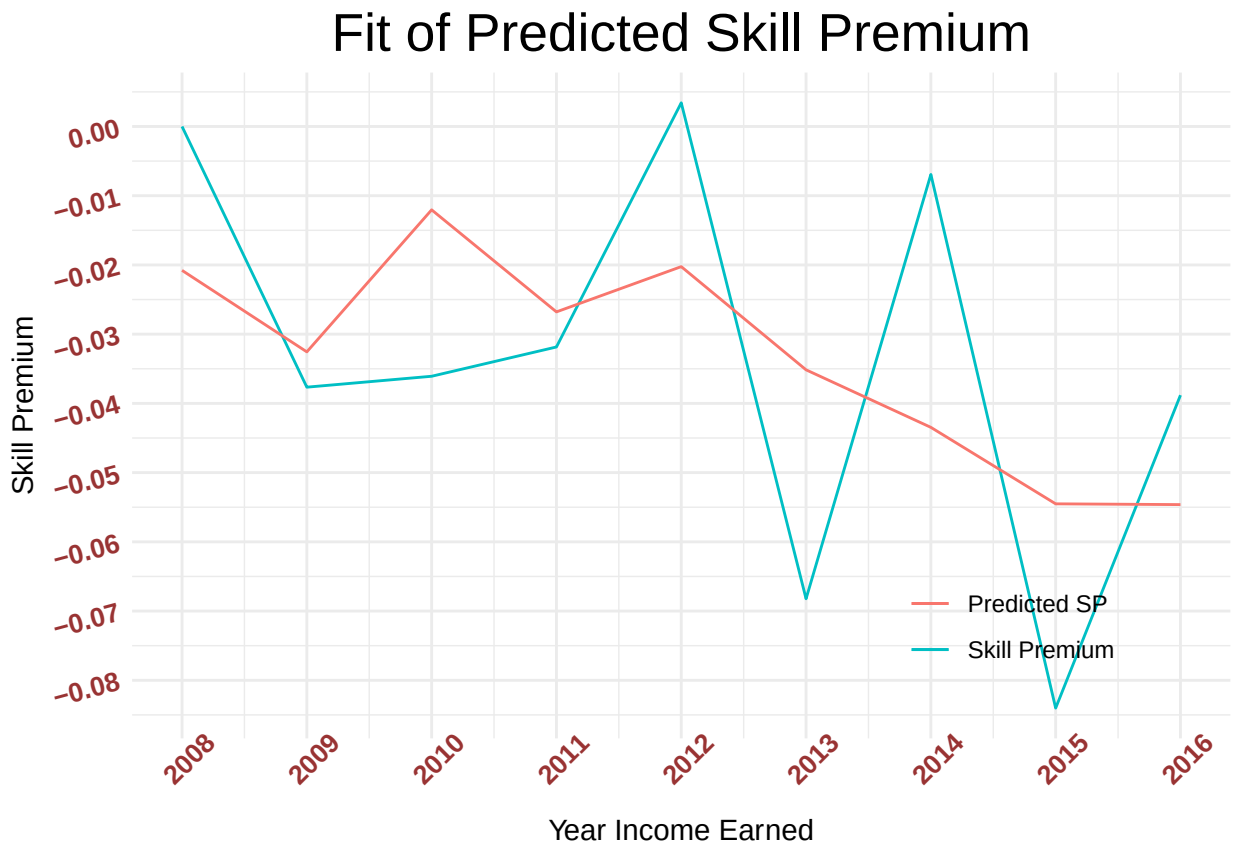
```
WageGap_plot
```



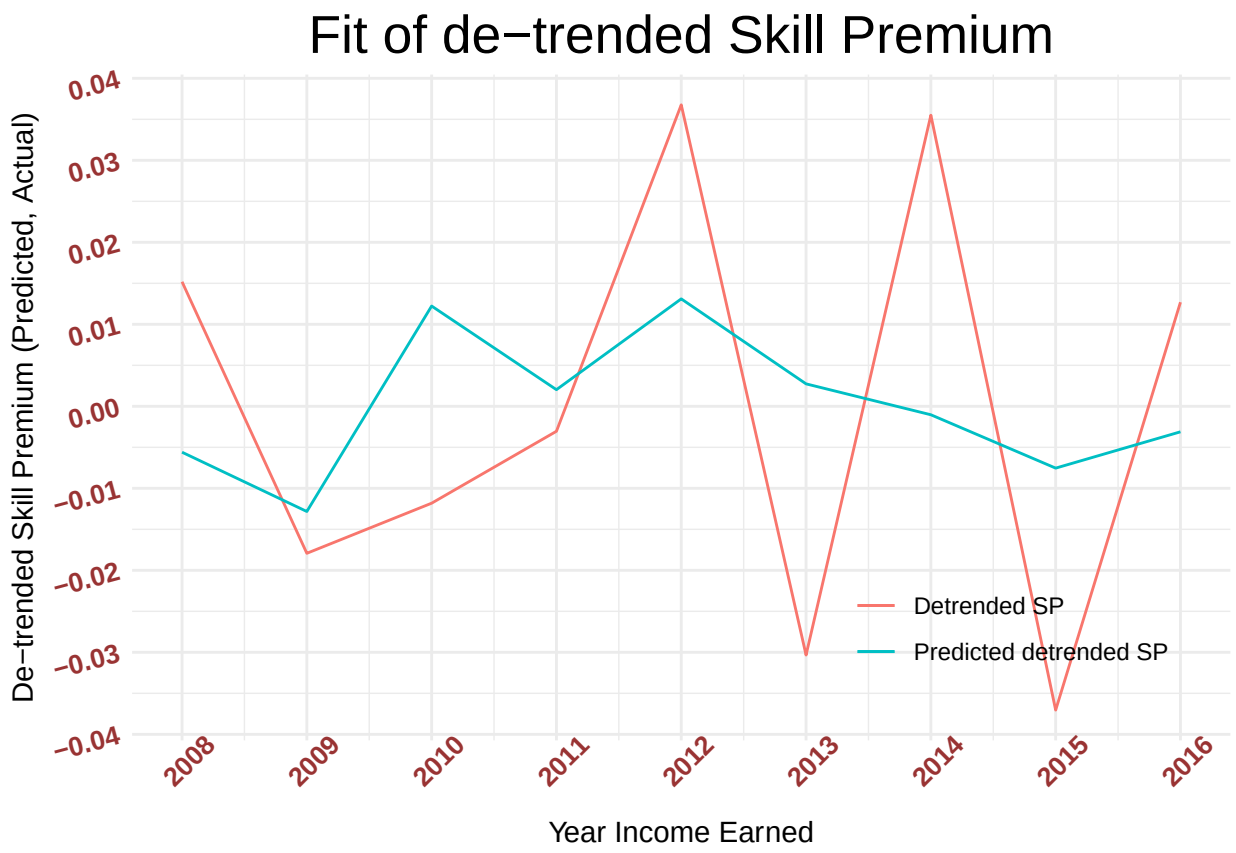

```
RelativeSupply_plot
```


Evolution of Relative Skill Supply
Change in Relative Supply
0.24
0.22
0.20
0.18
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
−0.02
2008
2009
2010
2011
2012
2013
2014
2015
2016
Year Income Earned

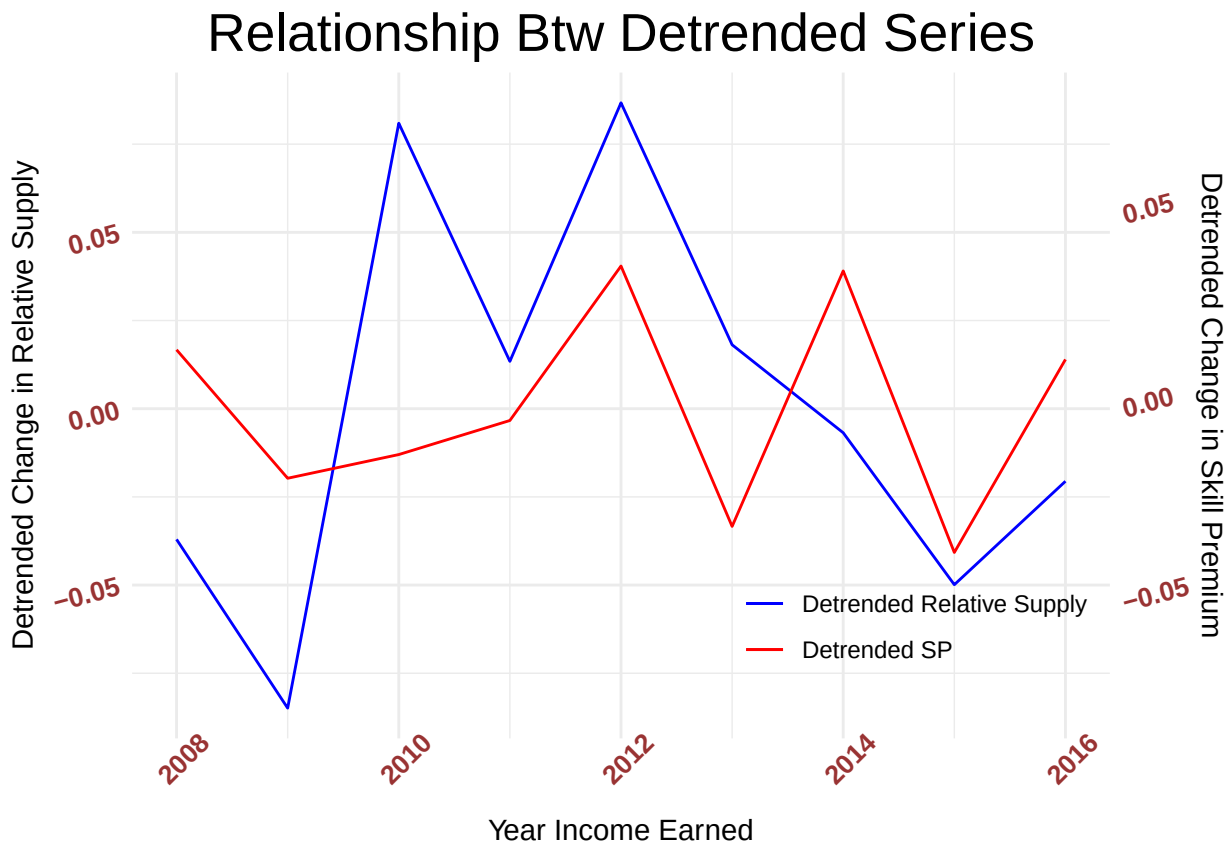
```
SPFit_plot
```




```
DetrendedSPFit_plot
```




```
DetrendDetrend_p
```




```
## [1] 2008 2009 2010 2011 2012 2013 2014 2015 2016
## [1]  0.0123248897 -0.0002447021  0.0125695918
```