A Derivations and Proofs

The propositions in the paper summarize the key results from the model. This appendix shows how to derive the results.

Proof of Proposition 1. Occupational Choice

The individual’s utility from choosing a particular occupation, \( U(\tau_i, w_i, \epsilon_i) \), is proportional to \( (\bar{w}_{ig}\epsilon)^{\frac{3}{\beta - \eta}} \), where \( \bar{w}_{ig} \equiv \frac{(T/3)w_i\delta^i[(1-s_i)z_{ig}])^{1/3}}{\tau_{ig}} \) and \( \frac{T}{3} \equiv \frac{1}{3} (1 + T(1 + T(3))) \) is the average of the lifetime experience terms. The solution to the individual’s problem, then, involves picking the occupation with the largest value of \( \bar{w}_{ig}\epsilon_i \). To keep the notation simple, we will suppress the \( g \) subscript in what follows.

Without loss of generality, consider the probability that the individual chooses occupation 1, and denote this by \( p_1 \). Then

\[
p_1 = \Pr \left[ \bar{w}_1\epsilon_1 > \bar{w}_s\epsilon_s \right] \quad \forall s \neq 1
\]

\[
= \Pr \left[ \epsilon_s < \bar{w}_1\epsilon_1/\bar{w}_s \right] \quad \forall s \neq 1
\]

\[
= \int F_1(\epsilon, \alpha_2\epsilon, \ldots, \alpha_M\epsilon) d\epsilon,
\]

where \( F_1(\cdot) \) is the derivative of the cdf with respect to its first argument and \( \alpha_i \equiv \bar{w}_1/\bar{w}_i \).

Recall that

\[
F(\epsilon_1, \ldots, \epsilon_M) = \exp \left[ \sum_{s=1}^{M} \epsilon_s \frac{-\theta}{\alpha_s} \right].
\]

Taking the derivative with respect to \( \epsilon_1 \) and evaluating at the appropriate arguments gives

\[
F_1(\epsilon, \alpha_2\epsilon, \ldots, \alpha_M\epsilon) = \theta\epsilon^{-\theta-1} \cdot \exp \left[ \alpha \epsilon^{1-\theta} \right]
\]

\[
(17)
\]

1
where \( \bar{\alpha} \equiv \sum_s \alpha_s^{-\theta} \).

Evaluating the integral in (17) then gives

\[
p_1 = \int F_1(\epsilon, \alpha_2 \epsilon, \ldots, \alpha_M \epsilon) d\epsilon \]
\[
= \frac{1}{\bar{\alpha}} \int \alpha \theta \epsilon^{-\theta-1} \cdot \exp(\alpha \epsilon^{-\theta}) d\epsilon \]
\[
= \frac{1}{\bar{\alpha}} \cdot \int dF(\epsilon) \]
\[
= \frac{1}{\bar{\alpha}} \]
\[
= \frac{1}{\sum_s \alpha_s^{-\theta}} \]
\[
= \frac{1}{\sum_s \bar{w}_s^\theta} \]

A similar expression applies for any occupation \( i \), so we have

\[
\tilde{p}_i = \frac{\bar{w}_i^\theta}{\sum_s \bar{w}_s^\theta} \]

**Proof of Proposition 2. Labor Force Participation**

In each period, conditional on choosing market sector \( i \), the individual compares her consumption from market work (equation (2)) with consumption from work in the home sector (equation (3)). She works in the market when

\[
\Omega_y^{\text{home}} < \epsilon^{\text{home}} < (1 - \tau_{iy}) w_i T \epsilon^* \]

where \( \epsilon^* \) is the ability of people in their chosen occupation. The probability of working in the market is thus

\[
LFP = \Pr[\Omega_y^{\text{home}} < \epsilon^{\text{home}} < (1 - \tau_{iy}) w_i T \epsilon^*] \]
\[
= \Pr[\epsilon^{\text{home}} < \mu \epsilon^*] \]

where \( \mu = \frac{(1 - \tau_{iy}) w_i T}{\Omega_y^{\text{home}}} \).

To calculate this probability, we need to know the distribution of \( \epsilon^* \). We use the extreme value magic of the Fréchet distribution. Let \( y_i \equiv \bar{w}_i \epsilon_i \) denote the key occupational
choice term. Then
\[ y^* \equiv \max_i \{ y_i \} = \max_i \{ \tilde{w}_i \epsilon_i \} = \tilde{w}^* \epsilon^*. \]

Since \( y_i \) is the thing we are maximizing, it inherits the extreme value distribution:

\[
\Pr[y^* < z] = \Pr[y_i < z] \quad \forall i
= \Pr[\epsilon_i < z/\tilde{w}_i] \quad \forall i
= F\left(\frac{z}{\tilde{w}_1}, \ldots, \frac{z}{\tilde{w}_M}\right)
= \exp\left[-\sum_s \tilde{w}_s^\theta z^{-\theta}\right]
= \exp\{-mz^{-\theta}\}. \tag{19}
\]

That is, the extreme value also has a Fréchet distribution, where \( m \equiv \sum_s \tilde{w}_s^\theta \).

Straightforward algebra then reveals that the distribution of \( \epsilon^* \), the ability of people in their chosen occupation, is also Fréchet:

\[
G(x) \equiv \Pr[\epsilon^* < x] \equiv \exp\left[-m^* x^{-\theta}\right] \tag{20}
\]

where \( m^* \equiv \sum_{s=1}^M (\tilde{w}_s/\tilde{w}^*)^\theta = 1/\tilde{p}^* \).

With the distribution of \( \epsilon^* \) in hand, we can now evaluate the probability of working in the market sector:

\[
LFP = \Pr[\epsilon^{\text{home}} < \mu \epsilon] = \int F_H(\mu \epsilon^*) dG(\epsilon^*) d\epsilon^*
\]

where \( F_H(\cdot) \) is the CDF of ability in the home sector. Since \( F_H(\mu \epsilon^*) = \exp\left[-\mu^{-\theta} \epsilon^*^{-\theta}\right] \) and \( dG(x) = \theta(1/\tilde{p}^*) x^{-\theta-1} G(x) \), after substituting and solving the integral, the probability of working in the market is given by:

\[
LFP = \frac{1}{1 + \tilde{p}^* \mu^{-\theta}}
\]
which simplifies to equation (5) after we replace \( \mu \) with \( \frac{(1 - \tau^w_i)w_iT}{\Omega^h_{i|g}} \).

**Proof of Proposition 3. Average Quality of Workers**

Total efficiency units of labor supplied to occupation \( i \) by group \( g \) are

\[
H_{ig} = q_{ig}p_{ig} \cdot \mathbb{E} [h_i \epsilon_i \mid \text{Person chooses } i \& \text{ work}].
\]

Recall that \( h(e, s) = s^{\phi_i}e^\eta \). Using the results from the individual’s optimization problem, it is straightforward to show that

\[
h_i \epsilon_i = (s_i^{\phi_i})^{\frac{1}{1 - \eta}} \left( \frac{\eta w_i (1 - \tau^w_i) T}{1 + \tau^h_i} \right)^{\frac{\eta}{1 - \eta}} \epsilon_i^{\frac{1}{1 - \eta}}.
\]

Therefore,

\[
H_{ig} = q_{ig}p_{ig}(s_i^{\phi_i})^{\frac{1}{1 - \eta}} \left( \frac{\eta w_i (1 - \tau^w_i) T}{1 + \tau^h_i} \right)^{\frac{\eta}{1 - \eta}} \cdot \mathbb{E} \left[ \epsilon_i^{\frac{1}{1 - \eta}} \mid \text{Person chooses } i \& \text{ work} \right]. \tag{21}
\]

We need to know the distribution of \( \epsilon^* \) conditional on choosing to work raised to some power. The distribution of \( \epsilon^* \) conditional on choosing to work is:

\[
H(x) \equiv \Pr [\epsilon^* < x \mid \epsilon^{\text{home}} < \mu \epsilon^*]
= \frac{\Pr [\frac{1}{\mu} \epsilon^{\text{home}} < \epsilon^* < x]}{LFP}
\]

We already have an expression for LFP so all we need is to solve for the numerator in this expression.

\[
\Pr [\frac{1}{\mu} \epsilon^{\text{home}} < \epsilon^* < x] = \int_0^x \int_0^{\mu \epsilon^*} dF(\epsilon^{\text{home}})dG(\epsilon^*)
= \int_0^x F(\mu \epsilon^*)dG(\epsilon^*)
= \frac{1}{1 + \mu} \cdot \exp \left[ -\left( \frac{1}{\mu} + \mu^{-\theta} \right) x^{-\theta} \right]
\]

After combining this result with equation (5), the distribution of \( \epsilon^* \) conditional on
working in the market is:

\[ H(x) \equiv \Pr [\epsilon^* < x | \epsilon^{\text{home}} < \mu \epsilon^*] \]

\[ = \exp \left[ - \left( \frac{1}{\bar{p}^*} + \mu - \theta \right) x^{-\theta} \right] \]

\[ = \exp \left[ - \left( \frac{1}{\bar{p}_{ig}} \right) x^{-\theta} \right] \]

where \( \bar{p}_{ig} \equiv LPF_{ig} \cdot \bar{p}_{ig}^* \) is the share of a group observed working in the occupation. The distribution of talent conditional on working is Fréchet with dispersion parameter \( \theta \) and mean parameter \( \frac{1}{\bar{p}_{ig}} \).

The last thing we need is an expression for the expected value of the chosen occupation’s ability raised to some power. Let \( i \) denote the occupation that the individual chooses, and let \( \lambda \) be some positive exponent. Then,

\[ \mathbb{E}[\epsilon_i^\lambda] = \int_0^\infty \epsilon^\lambda dG(\epsilon) \]

\[ = \int_0^\infty \theta \left( \frac{1}{\bar{p}_{ig}} \right) e^{-\theta - 1 + \lambda} e^{-\theta} d\epsilon \]

Recall that the “Gamma function” is \( \Gamma(\alpha) \equiv \int_0^\infty x^{\alpha-1} e^{-x} dx \). Using the change-of-variable \( x \equiv \frac{1}{\bar{p}_{ig}} \epsilon^{-\theta} \), one can show that

\[ \mathbb{E}[\epsilon_i^\lambda] = \left( \frac{1}{\bar{p}_{ig}} \right)^{\lambda/\theta} \int_0^\infty x^{-\lambda/\theta} e^{-x} dx \]

\[ = \left( \frac{1}{\bar{p}_{ig}} \right)^{\lambda/\theta} \Gamma \left( 1 - \frac{\lambda}{\theta} \right) . \]  

Applying this result to our model, we have

\[ \mathbb{E} \left[ \epsilon_i^{\frac{1}{1-\eta}} | \text{Person chooses } i \& \text{ works} \right] = \left( \frac{1}{\bar{p}_{ig}} \right)^{\frac{1}{2 \cdot 1 - \eta}} \Gamma \left( 1 - \frac{1}{\theta} \cdot \frac{1}{1 - \eta} \right) . \]

Substituting this expression into (21) and rearranging leads to equation (7)

**Proof of Proposition 4. Occupational Wage Gaps**

The proof of this proposition is straightforward given the results of Proposition 3. Note that \( \bar{\eta} \equiv \eta^{\eta/(1-\eta)} \).
**Proof of Proposition 5. Relative Propensities**

The fraction of a group working in an occupation relative to white men is given by:

\[
\frac{p_{ig}}{p_{i,wm}} = \left( \frac{LFP_{ig}}{LFP_{i,wm}} \right) \cdot \left( \frac{\hat{p}_{ig}}{\hat{p}_{i,wm}} \right)
\]

After substituting the results from propositions 1, 2, and 4 into the expression for relative propensities above and rearranging, we get equation (6).

**B Identification and Estimation**

This section explains how we identify and estimate the frictions and other parameters, carried out in the program EstimateTauZ.

**B1. Key Equations**

To estimate the model, we add two additional features to the model. First, in our base case, we assume the return to experience is the same for all occupations, groups, and cohorts, but we allow for differences across groups in the average amount of market experience over the life-cycle. For example, the market experience of the average middle-aged female may be lower than that of a comparable male (of the same cohort). Furthermore, in our robustness checks, we allow the returns to experience to also differ by occupations. We thus index \( T \) (and the sum of the experience terms \( \bar{T} \)) by group \( g \) and occupation \( i \) in the equations that follow.

Second, we also introduce a home talent term that is fixed over time but varies across occupations and group. Specifically, we assume the home talent term is given by \( \Omega_{ig}^{home}, \Omega_{g}^{home}(c)^{e^{home}} \). \( \Omega_{ig}^{home} \) varies across occupation-groups but is fixed across cohorts. \( \Omega_{g}^{home}(c) \) varies across cohorts for a given group but is the same across occupations. After we account for these two changes, the key equations we use for estimation are listed below.
**THE ALLOCATION OF TALENT**

**Occupational Choice:**
\[ p_i = \frac{\tilde{w}_i \theta}{\sum_s \tilde{w}_s \theta} \]

where
\[ \tilde{w}_{ig} \equiv w_i T_{ig} s_i \theta \frac{(1 - s_i) z_{ig}}{\tau_{ig}} \]

and
\[ \tau_{ig} = \frac{(1 + T_{ig}) \eta}{1 - T_{ig}} \]

**Labor Force Participation Rate:**
\[ LFP_{ig}(c, t) = \frac{1}{1 + \tilde{p}_{ig}(c)} \cdot \frac{\Omega_{home}(c) \Omega_{home}^{\prime} \left[ (1 - T_{ig}) w_i(t) T_{ig}(t-c) \right]}{\Omega_{home}(c) \Omega_{home}^{\prime} \left[ (1 - T_{ig}) w_i(t) T_{ig}(t-c) \right]} \]

**Occupational Share:**
\[ p_{ig}(c, t) = \tilde{p}_{ig}(c) \cdot LFP_{ig}(c, t) \]

**Average Quality:**
\[ \mathbb{E}[h_{ig}(c)\epsilon_{ig}(c, t)] = s_i(c)^{\phi(t)} \left[ \eta \cdot \frac{1 - \tau_{ig}^w(t)}{1 + \tau_{ig}^h(c)} \cdot w_i(t) \cdot T_{ig} \cdot s_i(c)^{\phi(t)} \right]^{\frac{\theta}{\eta}} \cdot \gamma \left( \frac{1}{p_{ig}(c, t)} \right)^{\frac{\theta}{\eta}} \]

**Average Wage:**
\[ \text{wage}_{ig}(c, t) \equiv (1 - T_{ig}(t)) w_i(t) \cdot T_{ig} \cdot \mathbb{E}[h_{ig}(c)\epsilon_{ig}(c, t)] \]
\[ = \gamma \eta \left[ \frac{m_{ig}(c, t)}{LFP_{ig}(c, t)} \right]^{\frac{\eta}{\tau_{ig}}} \left[ (1 - s_i(c)) z_{ig}(c) \right]^{\frac{\theta}{\eta}} \cdot \frac{(1 - T_{ig}(t)) w_i(t) T_{ig} s_i(c)^{\phi(t)}}{(1 - T_{ig}(c)) w_i(c) T_{ig} s_i(c)^{\phi(t)}} \]

where
\[ m_{ig}(c, t) = \sum_{i=1}^{M} \tilde{w}_{ig}(c, t)^{\theta} \]

**Relative Propensity:**
\[ \frac{p_{ig}(c, c)}{p_{i,wm}(c, c)} = \left( \frac{T_{ig}}{T_{i,wm}} \right)^{\theta(1-\eta)} \left( \frac{\tau_{ig}(c, c)}{\tau_{i,wm}(c, c)} \right)^{-\theta} \left( \frac{\text{wage}_{ig}(c, c)}{\text{wage}_{i,wm}(c, c)} \right)^{-\theta(1-\eta)} \left( \frac{T_{ig}}{T_{i,wm}} \right)^{\theta \eta} \]

**B2. Estimate Wages & Schooling from data of young white men**

The following refers to the program `solvefor_w_phi_given_subsidy`. This program uses data on wages and occupational shares of young white men to estimate \( w_i \) and \( \phi_i \).
First, we assume a value of $\phi$ in the farming occupation. Using this normalization, we back out $s$ in farming from the following equation:

$$s_{farm} = \frac{1}{1 + \frac{1-\eta}{3\beta\phi_{farm}}}$$

Second, we use equation for the average wage and $s_{farm}$ (from the previous step) to back out $m_{wm}$. After omitting the indices for cohort and time, the specific equation is:

$$m_{wm} = LFP_{i,wm} \left[ \frac{wage_{i,wm}(1 - s_i)^{\frac{1}{\beta \gamma \eta}} \cdot \frac{T_{i,wm}}{\bar{T}_{i,wm}}}{\bar{T}_{i,wm}} \right]^{\theta(1-\eta)}$$

where $i = farm$. We assume that $LFP$ in the farm sector is equal to the aggregate labor force participation rate of young white men and the average wage in the farm sector $\bar{wage}_{farm,wm}$ is data. Furthermore, we need to make an initial guess about the returns to experience terms $T$ and $\bar{T}$. (We describe later how we estimate the return to experience terms).

Third, now that we have an estimate of $m_{wm}$, we recover $w_{home}^{w}$ and $\Omega_{home}^{i,wm}$ such that $LFP_{i,wm}$ in every occupation is exactly equal to the observed aggregate labor force participation rate for young white men. Specifically, after substituting the expression for $\bar{p}_{ig}$ into the expression for $LFP_{ig}$ and simplifying, we get:

$$LFP_{i,wm} = \left[ 1 + \left[ \Omega_{home}^{i,wm} \Omega_{home}^{i,wm} \tau_{i,wm} s_{i}^{\phi_{i}} (1 - s_{i})^{\frac{1}{\beta \gamma \eta}} \right]^{\theta} \cdot \frac{1}{m_{wm}} \right]^{-1}$$

where we assume $LFP_{i,wm}$ is the same in all occupations and equal to the aggregate labor force participation rate observed in the data for young white men. Remember that $\tau_{i,wm} = 1$ (we normalize $\tau^{w}$ and $\tau^{h}$ to zero for white men) and $z_{i,wm} = 1$ for white men which is why these terms do not show up in the above equation. We have $M$ observations and $M + 1$ parameters ($M$ parameters for $\Omega_{home}^{i,wm}$ and one parameter for $\Omega_{home}$ so we normalize the average of $\Omega_{home}^{i,wm}$ to one.

Fourth, we estimate $s_{i}$ for the other occupations (non-farming) from the equation we use above to back out $m_{wm}$ from data on wages in the farm sector. In this case, we use data on the average wage on the occupation, the aggregate labor force participation rate for the group and cohort, and the estimate for $m_{wm}$ we obtained from step 2 to back
out the $s_i$ that fits the wage equation. This value of $s_i$ then allows us to back out $\phi_i$ for
the occupation.

Fifth, we estimate $w_i$ from the observed occupational shares. After some algebra, the occupational
share equation can be expressed as:

$$w_i = \left[ \frac{p_{i,wm} \cdot m_{wm}}{LFP_{wm}} \right]^{\frac{1}{\eta}} \cdot \frac{1}{T_{i,wm} \cdot s_i^{\phi_i} \left( 1 - s_i \right)^{\frac{1}{\eta}}}
$$

Again, $\tau = 1$ and $z = 1$ for white men so these two terms do not show up.

Sixth, we estimate $T$ and $\bar{T}$ (remember we assumed a value for the experience terms
for the previous steps) from the change in the average wage of a given cohort and
occupation over time. Specifically, the ratio of the average wage in an occupation at
time $t$ to that at time $c$ is:

$$\frac{\text{wage}_{i,wm}(c,t)}{\text{wage}_{i,wm}(c,c)} = \left[ \frac{LFP_{wm}(c,c)}{LFP_{wm}(t,c)} \right]^{\frac{1}{\eta}} \cdot \frac{1}{w_i(t)T_{ig}(c,t)s_i^{\phi(t)}} \cdot \frac{w_i(c)T_{ig}(c,c)s_i^{\phi(c)}}{w_i(c)T_{ig}(c,c)s_i^{\phi(c)}}$$

We normalize $T_{i,wm}(c,c) = 1$ and estimate $T_{i,wm}(c,t)$ from the change in the average
wage in an occupation, after controlling from the effect of changes in the labor force
participation rate (which is simply the change in the observed occupational shares) and
the change in $w_i$. We then adjust $T_{ig}$ for the other groups using the observed changes
in labor force participation rates for a given cohort. Specifically, we assume $T_{ig}$ is the
product of the experience terms of white men of the same cohort and $p_{ig}(c,c) / p_{ig}(c,t)$ in the
cases when this ratio falls with age. When the average occupational share in the group
declines, we assume $T_{ig}$ is equal to that of white men. In our base case, we assume
$T_{ig}$ is the same across all occupations and cohorts so simply take the average across
all occupations and cohorts. In our robustness checks, we allow $T_{ig}$ to vary across
occupations.

Finally, we assume $\Omega_{i,wm}^{\text{home}}$ for all cohorts is the minimum of the $\Omega_{i,wm}^{\text{home}}$ observed
across all cohorts. We then iterate over steps (2)-(5) with this fixed value of $\Omega_{i,wm}^{\text{home}}$
to obtain final values of $w_i$ and $\phi_i$. 
B3. Estimating \( \hat{\tau} \)

The next part of the estimation obtains the composite of the distortions \( \tau_{ig} \equiv \frac{(1+\tau^h)^\eta}{1-\tau^w} \). Remember we assume \( \tau_{i,wm}^w = \tau_{i,wm}^h = 0 \). This normalization implies that we can express the relative propensity expression as:

\[
\tau_{ig} = \hat{T}_{ig}^{1-\eta} \cdot \hat{p}_{ig}^{\frac{1}{\eta}} \cdot \frac{\hat{\text{wage}}_{ig}^{\frac{1-(1-\eta)}{\eta}}}{\hat{T}_{ig}}
\]

where a “hat” denotes the value of the variable relative to white men. In this equation, \( \hat{\text{wage}}_{ig} \) and \( \hat{p}_{ig} \) are data and \( \hat{T}_{ig} \) and \( \hat{T}_{ig} \) are estimated from the previous step.

B4. Estimating \( \tau^w, \tau^h, \) and \( \alpha \)

The next step is to estimate \( \alpha \) and the components of \( \tau \) (i.e. \( \tau^w \) and \( \tau^h \)) for the other groups (non-white men). This is done in the programs estimatetauz, eval_young, and eval_middle. We define \( \alpha \) as the Cobb-Douglas split of \( \tau \) that recovers \( 1 - \tau^w \).

Specifically, \( \tau^\alpha = \frac{1}{1 - \tau^w} \) and \( \tau^{1-\alpha} = (1 + \tau^h)^\eta \)

This implies the following definitions of \( \tau^w \) and \( \tau^h \) as a function of \( \tau \) and \( \alpha \):

\[
\tau^w = 1 - \tau^{-\alpha}
\]
\[
\tau^h = (\tau^{1-\alpha})^{\frac{1}{\eta}} - 1
\]

Our estimation of \( \tau^w \) and \( \tau^h \) is expressed in terms of \( \alpha \).

Our first step is to estimate \( \Omega^\text{home}_{ig} \) and \( \Omega^\text{home}_g \) for the other groups (other than white men). We start with an initial guess of \( \alpha \) and allow \( \Omega^\text{home}_{ig} \) to vary across cohorts such that the predicted labor force participation rates in every occupation is exactly equal to the aggregate labor force participation rate of the young cohort of the group (we assume \( \Omega^\text{home}_g = 1 \) in this first step). Specifically, the labor force participation equation can be expressed as a function of \( \Omega^\text{home}_{ig} \):

\[
\Omega^\text{home}_{ig} = \left[ 1 - \frac{LFP_{ig} \cdot \Omega^\text{home}_g}{\hat{p}_{ig}} \right]^{\frac{1}{\eta}} \cdot \frac{(1 - \tau^w_{ig}) \cdot \hat{T}_{ig}}{\Omega^\text{home}_g}
\]

To be clear, we assume \( LFP_{ig} \) is equal for all occupations and given by the aggregate
LFP observed in the data (for the young of group $g$ of the specific cohort).

Second, we set $\Omega_{ig}^{\text{home}}$ equal to its minimum across all cohorts. Without further changes, the aggregate labor force participation rate in the model will not be equal to that in the data. To correct this, we do two things. For the young in 1960, we pick the value of $\alpha$ (the split of $\tau$ into $\tau^w$ and $\tau^h$) such that $LFP$ in every occupation is equal to the aggregate $LFP$ observed in the data. This pins down the split of $\tau$ into $\tau^w$ and $\tau^h$ in 1960.

For the young in later years (after 1960), we use the same equation for $\Omega_{ig}^{\text{home}}$ above and allow $\Omega_{ig}^{\text{home}}$ to vary across cohorts such that predicted aggregate labor force participation rate in the model is equal to the aggregate labor force participation rate observed in the data. To be clear, we do not impose the condition that $LFP$ in every occupation is equal to the aggregate $LFP$ in the data. Instead, $LFP$ varies across occupations but we choose $\Omega_{ig}^{\text{home}}$ such that the weighted average of $LFP$ in the model is equal to the aggregate $LFP$ observed in the data for young cohorts after 1960. We also impose the constraint that the lowest possible value of $LFP$ in an occupation is 50 percent of the aggregate $LFP$ of each cohort-group observed in the data.

Third, we normalize $z = 1$ for the farm sector and back out $m_g$ for the group based on data on the average wage in the farm sector. Specifically, after some manipulation, the average wage equation for the sector can be expressed as:

$$m_g(c) = LFP_{farm,g}(c,c) \left[ \frac{\text{wage}_{farm,g}(c,c)(1 - s_{farm}(c))^{\frac{1}{\gamma \eta}}}{\gamma \eta} \cdot \frac{T_{farm,g}}{T_{farm,g}} \right]^{\theta(1-\eta)}$$

For the non-farm sectors, we use the same wage equation to back out $z$. Specifically, the wage equation can be expressed as:

$$z_{ig} = \frac{1}{1 - s_i} \cdot \left[ \frac{m_g}{LFP_{ig}} \right]^{\frac{1}{\gamma} \cdot \frac{1}{1-\eta}} \cdot \frac{T_{ig}}{T_{ig}} \cdot \frac{1}{\text{wage}_{ig}} \right]^{3\beta}$$

We now have $z$ for all cohorts and $\tau^w$ and $\tau^h$ for the young cohort in 1960. What is left is to pin down $\tau^w$ and $\tau^h$ for the years after 1960. We have two ways to do this. First, we can use the labor force participation equation for the young and the middle-aged of
the same cohort. After some manipulation, this can be expressed as:

\[
\tau_{ig}(c, t) = \left[ \frac{LFP_{ig}(c, t)}{1 - LFP_{ig}(c, t)} \cdot \tilde{p}_{ig}(c) \right]^{\frac{1}{\pi}} \cdot \left[ \frac{\Omega_{\text{home}}(c) \cdot \Omega_{\text{home}}(c)}{w_i(t) \cdot T_{ig}(t - c)} \right] - 1
\]

A second option is to use the change in the average wage for a given occupation and cohort. Specifically, after some manipulation, \( \tau^w \) for the years after 1960 can be expressed as a function of the change in the average wage of a given cohort and \( \tau^w \) in the previous year:

\[
1 - \tau^w_{ig}(t) = \frac{\text{wage}_{ig}(c, t)}{\text{wage}_{ig}(c, c)} \cdot \left[ \frac{LFP_{ig}(c, t)}{LFP_{ig}(c, c)} \right]^{\frac{1}{\pi}} \cdot \frac{w_i(c) s_i^{\phi(c)}}{w_i(t) T_{ig}(t - c) s_i^{\phi(t)}} \cdot (1 - \tau^w_{ig}(c))
\]

We estimate the last two equations sequentially, starting with the young in 1960, then the young in 1970, and so forth, subject to the constraints that \( \alpha \) (the split of \( \tau \) between \( \tau^h \) and \( \tau^w \)) is between 0 and 1 and the minimum value of \( \tau^h \) is -0.8. We put more weight (75%) on fitting the change in the wage than on fitting the change in occupational shares (25%) between the young and middle-aged of each group.

\( \text{C Appendix Tables} \)
### Table C1: Sample Statistics by Census Year

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<thead>
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<tbody>
<tr>
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<td>674,059</td>
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<td>4,607,829</td>
<td>5,084,891</td>
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<td>0.185</td>
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<td>0.127</td>
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</table>

Note: Data comes from the 1960-2000 U.S. Censuses and the pooled 2010 American Community Survey (ACS). Samples restricted to black and white, men and women between the ages of 25 and 54. Those in the military are excluded. Also, excluded are those not working but actively searching for a job. Sample shares are weighted using Census and ACS provided sample weights.
### Table C2: Occupation Categories for our Base Occupational Specifications

<table>
<thead>
<tr>
<th></th>
<th>Occupation Categories</th>
<th></th>
<th>Occupation Categories</th>
</tr>
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<tbody>
<tr>
<td>0.</td>
<td>Home Sector (0)</td>
<td>34.</td>
<td>Police (12)</td>
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<tr>
<td>1.</td>
<td>Executives, Administrative, and Managerial (1)</td>
<td>35.</td>
<td>Guards (12)</td>
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<td>2.</td>
<td>Management Related (2)</td>
<td>36.</td>
<td>Food Preparation and Service (13)</td>
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<tr>
<td>3.</td>
<td>Architects (3)</td>
<td>37.</td>
<td>Health Service (6)</td>
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<tr>
<td>4.</td>
<td>Engineers (3)</td>
<td>38.</td>
<td>Cleaning and Building Service (13)</td>
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<tr>
<td>5.</td>
<td>Math and Computer Science (3)</td>
<td>39.</td>
<td>Personal Service (13)</td>
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<tr>
<td>6.</td>
<td>Natural Science (4)</td>
<td>40.</td>
<td>Farm Managers (14)</td>
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<tr>
<td>7.</td>
<td>Health Diagnosing (5)</td>
<td>41.</td>
<td>Farm Non-Managers (14)</td>
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<td>8.</td>
<td>Health Assessment (6)</td>
<td>42.</td>
<td>Related Agriculture (14)</td>
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<tr>
<td>9.</td>
<td>Therapists (6)</td>
<td>43.</td>
<td>Forest, Logging, Fishers, &amp; Hunters (14)</td>
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<tr>
<td>10.</td>
<td>Teachers, Postsecondary (7)</td>
<td>44.</td>
<td>Vehicle Mechanic (15)</td>
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<tr>
<td>11.</td>
<td>Teachers, Non-Postsecondary (8)</td>
<td>45.</td>
<td>Electronic Repairer (15)</td>
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<tr>
<td>12.</td>
<td>Librarians and Curators (8)</td>
<td>46.</td>
<td>Misc. Repairer (15)</td>
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<td>13.</td>
<td>Social Scientists and Urban Planners (4)</td>
<td>47.</td>
<td>Construction Trade (15)</td>
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<td>14.</td>
<td>Social, Recreation, and Religious Workers (4)</td>
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<td>Executive (14)</td>
</tr>
<tr>
<td>15.</td>
<td>Lawyers and Judges (5)</td>
<td>49.</td>
<td>Precision Production, Supervisor (16)</td>
</tr>
<tr>
<td>16.</td>
<td>Arts and Athletes (4)</td>
<td>50.</td>
<td>Precision Metal (16)</td>
</tr>
<tr>
<td>17.</td>
<td>Health Technicians (9)</td>
<td>51.</td>
<td>Precision Wood (16)</td>
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<tr>
<td>18.</td>
<td>Engineering Technicians (9)</td>
<td>52.</td>
<td>Precision Textile (16)</td>
</tr>
<tr>
<td>19.</td>
<td>Science Technicians (9)</td>
<td>53.</td>
<td>Precision Other (16)</td>
</tr>
<tr>
<td>20.</td>
<td>Technicians, Other (9)</td>
<td>54.</td>
<td>Precision Food (16)</td>
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<td>21.</td>
<td>Sales, All (10)</td>
<td>55.</td>
<td>Plant and System Operator (17)</td>
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<td>23.</td>
<td>Information Clerks (11)</td>
<td>57.</td>
<td>Metal &amp; Plastic Processing Operator (17)</td>
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<tr>
<td>29.</td>
<td>Scheduling and Distributing Clerks (11)</td>
<td>63.</td>
<td>Production Inspectors (18)</td>
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<tr>
<td>30.</td>
<td>Adjusters and Investigators (11)</td>
<td>64.</td>
<td>Motor Vehicle Operator (19)</td>
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<td>32.</td>
<td>Private Household Occupations (13)</td>
<td>66.</td>
<td>Freight, Stock, &amp; Material Handlers (18)</td>
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<td>33.</td>
<td>Firefighting (12)</td>
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</tbody>
</table>

Notes: Our 66 market occupations are based on the 1990 Census Occupational Classification System. We use the 66 sub-headings (shown in the table) to form our occupational classification. See http://www.bls.gov/nls/quex/r1/y97r1cbka1.pdf for the sub-heading as well as detailed occupations that correspond to each sub-heading. As discussed in the text, we include the home sector as an additional occupation. When computing racial barriers at the state level, we use only twenty broader occupations. The number in parentheses refers to how we group these 67 occupations into the twenty broader occupations for the cross-state analysis. For example, all occupations with a 11 in parentheses refers to the fact that these occupations were combined to make the 11th occupation in our broader occupation classification.