

RAND

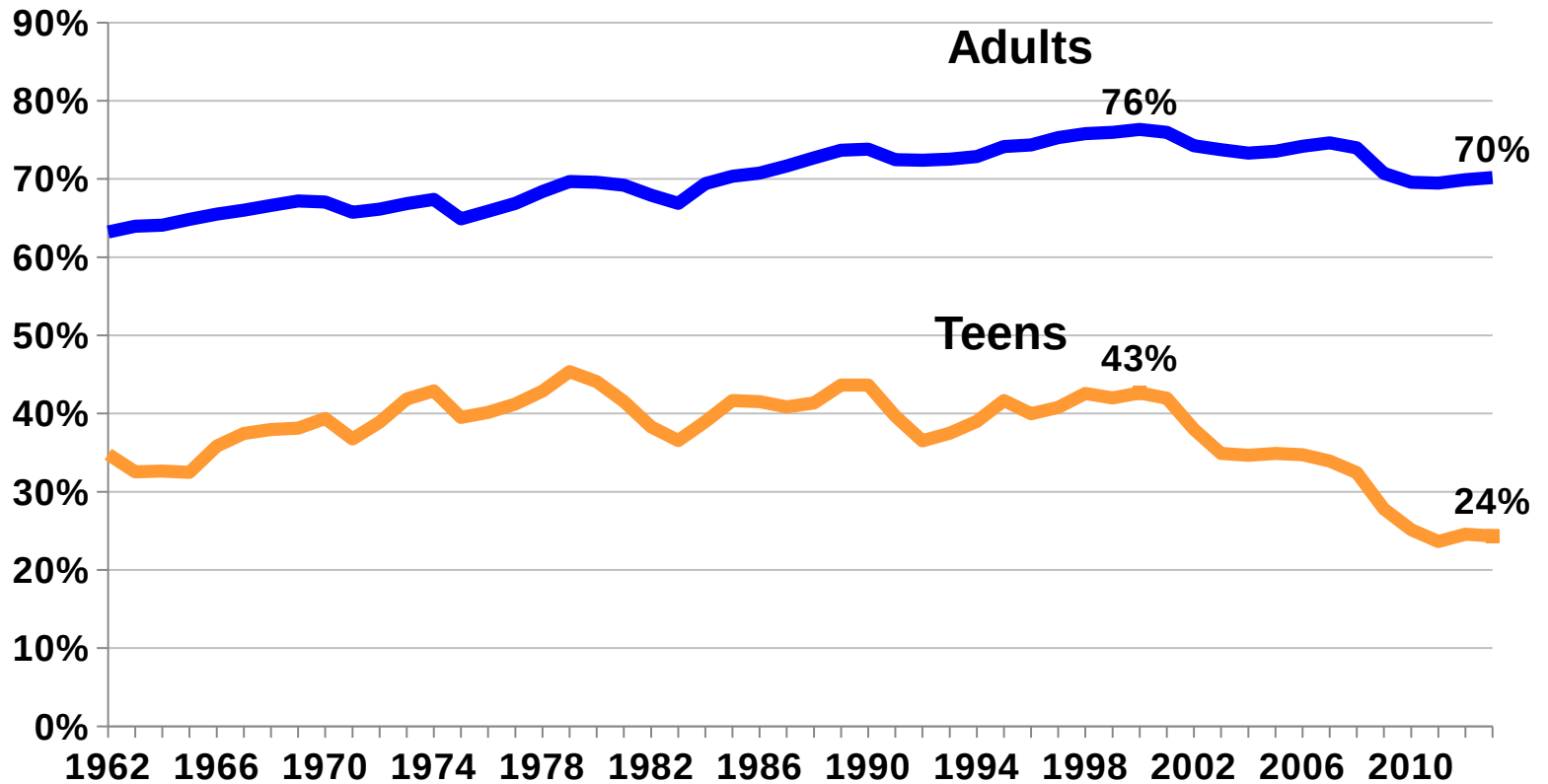
GRADUATE SCHOOL

# *Analyzing Reduced Teenage Employment, 2000-2013*

*January 27, 2016  
Abigail Haddad*

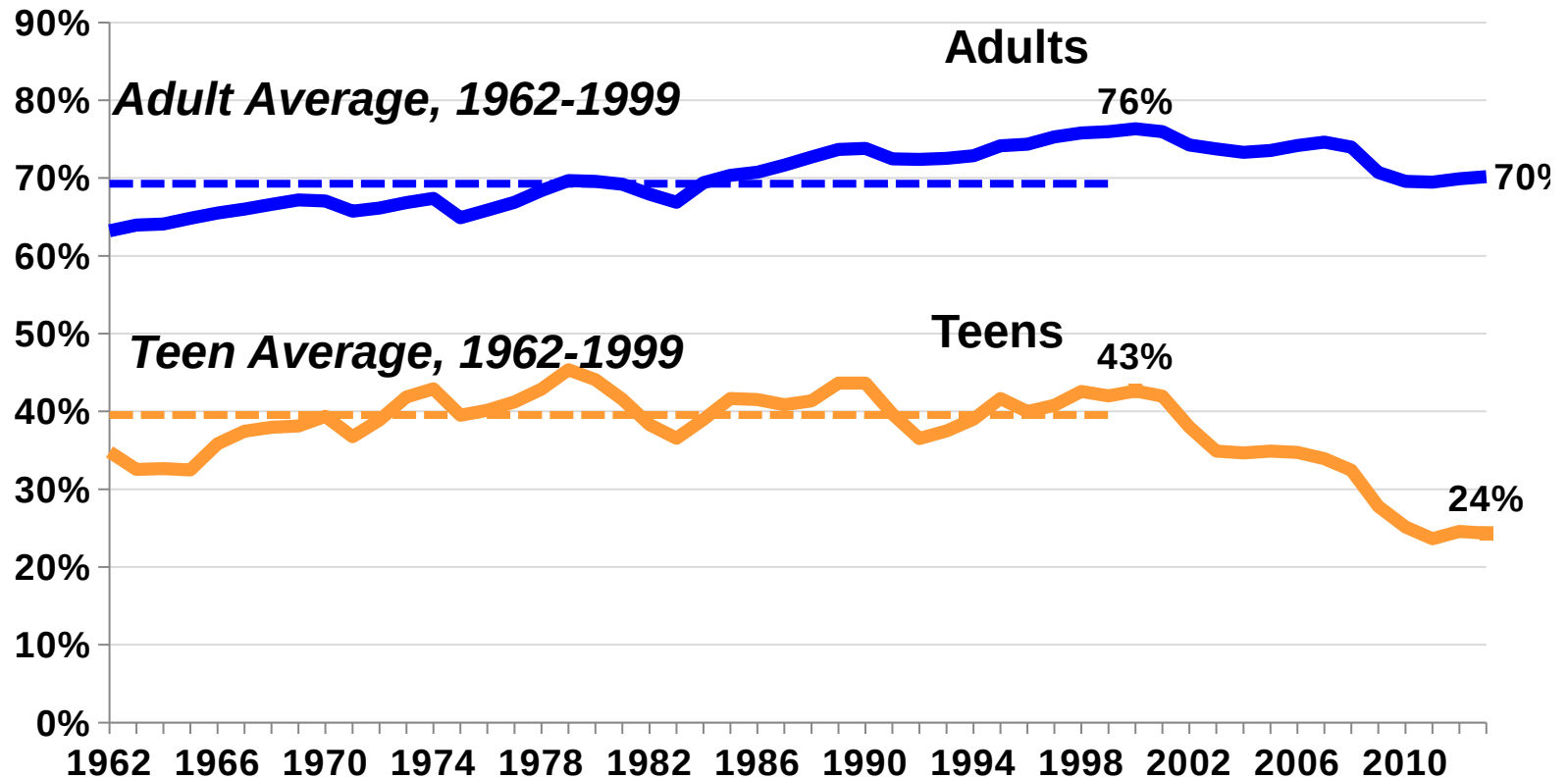
# Teen Employment Dropped From 2000-2013

Percent employed



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Percent employed



# ***Which Statement is Correct?***

- A. Employment fell for teens in and out of school**
- B. Employment just fell for teens in school**

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**A. The drop in employment is from teens who don't want to work**

**B. The drop in employment is from teens who report not being able to find jobs**

# ***Which Statement is Correct?: Answers***

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# ***Lower Employment Due to Both Supply, Demand Factors***

- **Reduction in the supply of teenage labor: rising returns to education**
- **Reduction in demand for teenage labor: employers increasingly substitute adults**

***Current programs: highly-variant in terms of targeting, assessment***



# *Today's Talk*

- **Explanations and predictions**
- **Summarizing the evidence**
- **Evaluating current programs based on findings**

# *Five Possible Explanations*

- Decreased **supply** of teenagers due to increased returns to education?
- Decreased **demand** for teenagers due to more competition from:
  - Less-educated workers?
  - Immigrants?
  - Adults in general?
- Increasingly binding **minimum wage laws**?

# *Thinking About Evidence*

<i>Color</i>	<i>Meaning</i>
<i>Green</i>	<i>Statistically significant effect, predicted direction</i>
<i>Yellow</i>	<i>No statistically significant effect, or effects in predicted and opposite of predicted direction</i>
<i>Red</i>	<i>Statistically significant effect, opposite of predicted direction</i>
<i>Gray</i>	<i>No predictions regarding this evidence</i>

# *Today's Talk*

- **Explanations and predictions**
- **Summarizing the evidence**
- **Evaluating current programs based on findings**

# ***In Statistical Model, Supply-Related Factors Explain Drop in Employment***

<i><b>Evidence</b></i>	<b>School status</b>	<b>High-school dropouts</b>	<b>Immigrants</b>	<b>Education/wage stratification</b>	<b>Minimum wage</b>
<i>Supply: Education</i>					
<i>Demand: Unskilled Labor</i>					
<i>Demand: Immigrants</i>	▬		▬		
<i>Demand: Other Adult Workers</i>	▬	▬			
<i>Wage Floor: Minimum Wage</i>					▬

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<i>Supply: Education</i>	Green	White	White	Green	White
<i>Demand: Unskilled Labor</i>	Yellow	White	White	White	White
<i>Demand: Immigrants</i>	Yellow	White	Yellow	White	White
<i>Demand: Other Adult Workers</i>	Yellow	White	White	White	White
<i>Wage Floor: Minimum Wage</i>	White	White	White	White	Light Green



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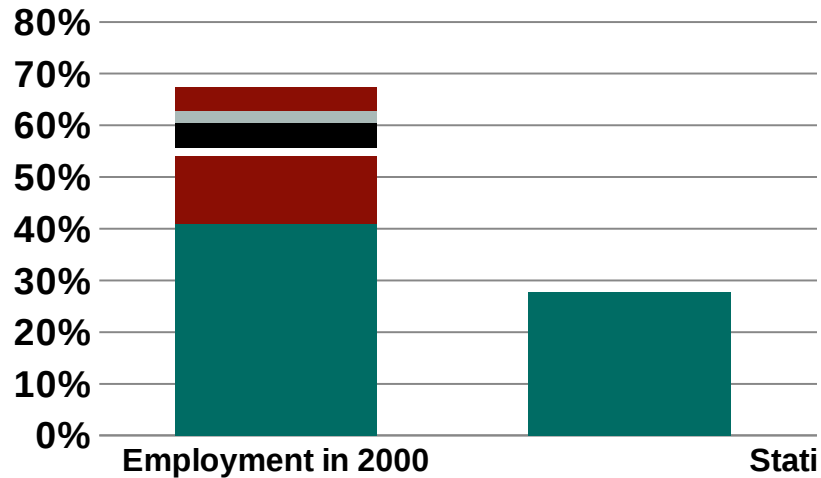
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<i>Supply: Education</i>	Green			Green	
<i>Demand: Unskilled Labor</i>	Yellow				
<i>Demand: Immigrants</i>	Yellow		Yellow		
<i>Demand: Other Adult Workers</i>	Yellow				
<i>Wage Floor: Minimum Wage</i>					Yellow

# ***Decomposition Model***

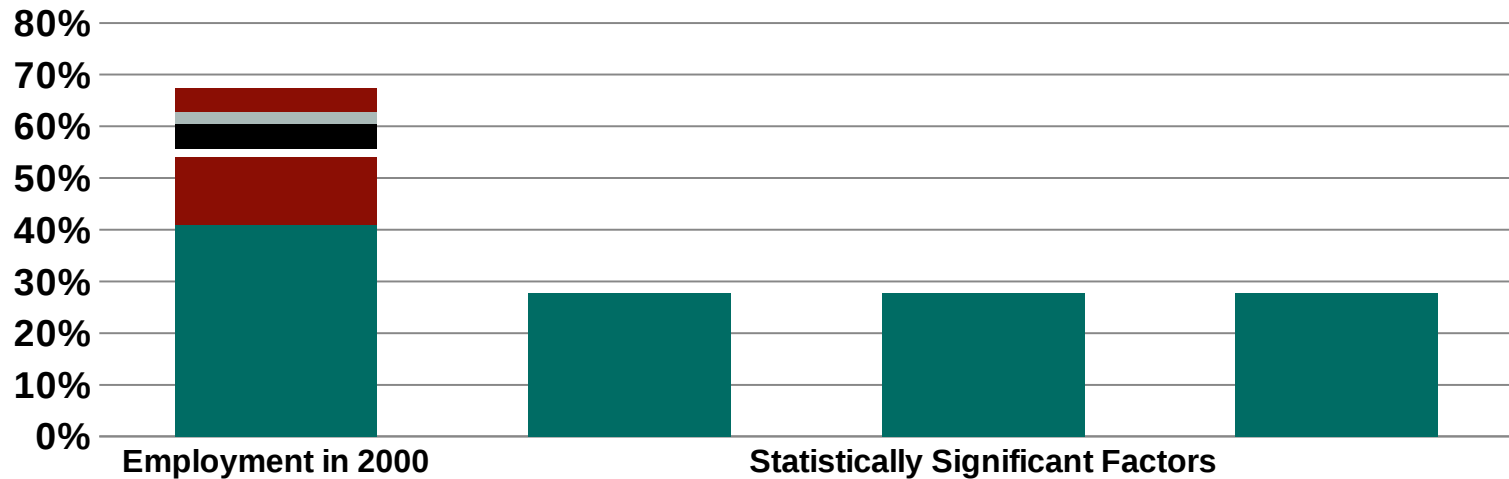
- **Variant of Oaxaca-Blinder for non-linear models:**
  - **Employment status as a function of individual-level and area-level characteristics**
- **Decomposition of drop in teenage employment as a function of:**
  - **Changes related to differences in composition**
  - **Changes related to differences in coefficients**

# The Gap...




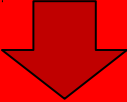
- Baseline
- Representation Gap
- School Status, Composition
- School Status, Coefficient
- Ratio HS Dropout: College Grad

# *Is Mostly Explained by Three Factors*



- Baseline
- Representation Gap
- School Status, Composition
- School Status, Coefficient
- Ratio HS Dropout: College Grad Income (State), Composition
- Other

# Evidence Regarding Teenagers and Schooling Is Mixed

<i><b>Evidence</b></i>	<b>School status</b>	<b>College intentions</b>	<b>Time spent on academic activities</b>	<b>School vs. work status</b>
<i>Supply: Education</i>				
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<i><b>Evidence</b></i>	<b>School status</b>	College intentions	Time spent on academic activities	School vs. work status
<i>Supply: Education</i>	<b>Green</b>	Light Green	Yellow-Green	Red
<i>Demand: Unskilled Labor</i>				Light Green
<i>Demand: Immigrants</i>				Light Green
<i>Demand: Other Adult Workers</i>				Light Green
<i>Wage Floor: Minimum Wage</i>	Light Gray	Light Gray		Light Green

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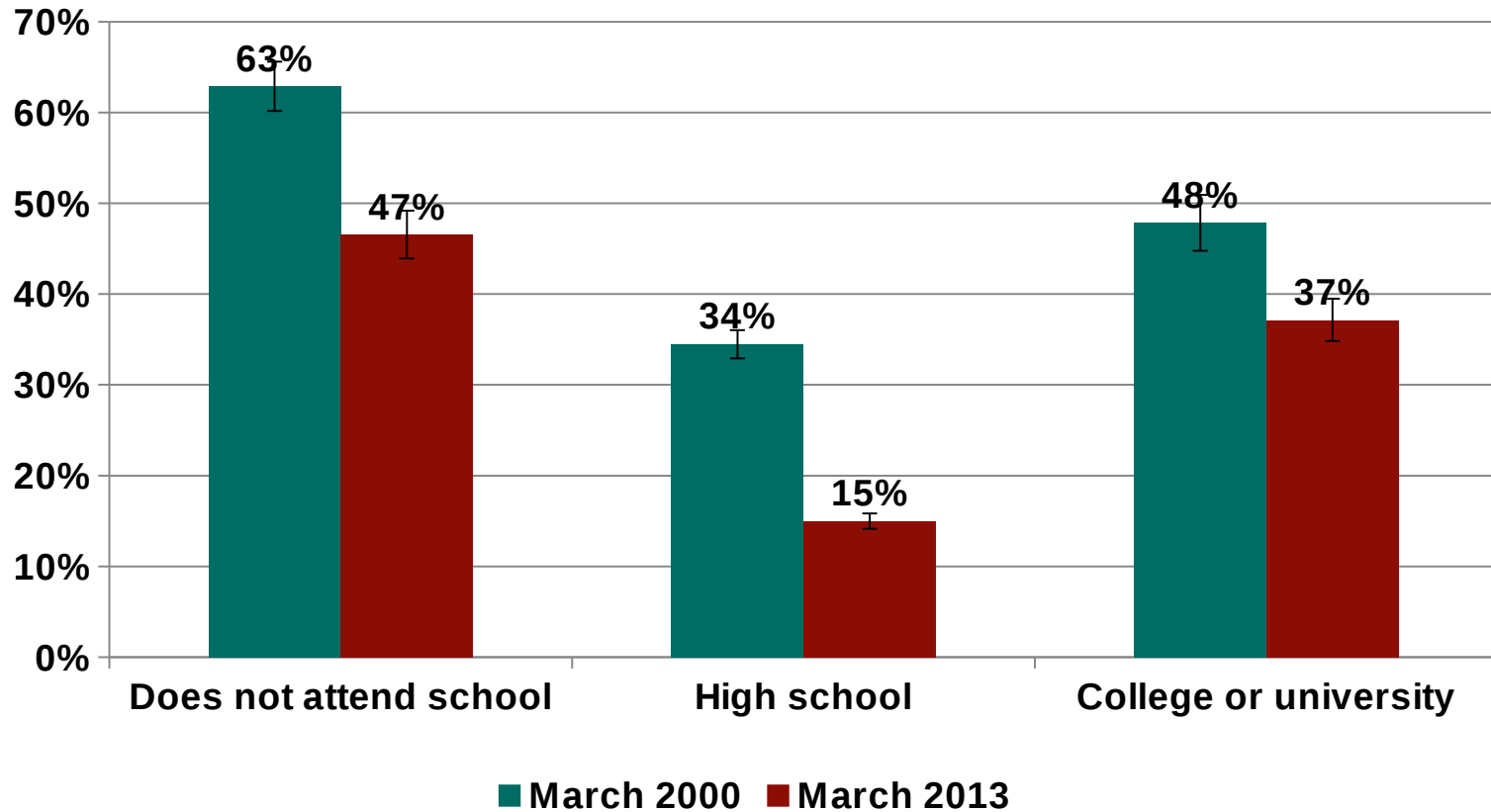
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<i>Evidence</i>	School status	College intentions	Time spent on academic activities	School vs. work status
<i>Supply: Education</i>	Green	Green	Yellow	Red
<i>Demand: Unskilled Labor</i>				Green
<i>Demand: Immigrants</i>				Green
<i>Demand: Other Adult Workers</i>				Green
<i>Wage Floor: Minimum Wage</i>	Grey			Green

# *Employment Has Dropped for Students and Non-Students*



# ***Evidence Regarding Teenage-Type Jobs Supports Demand Explanation In General, Immigration explanation Specifically***

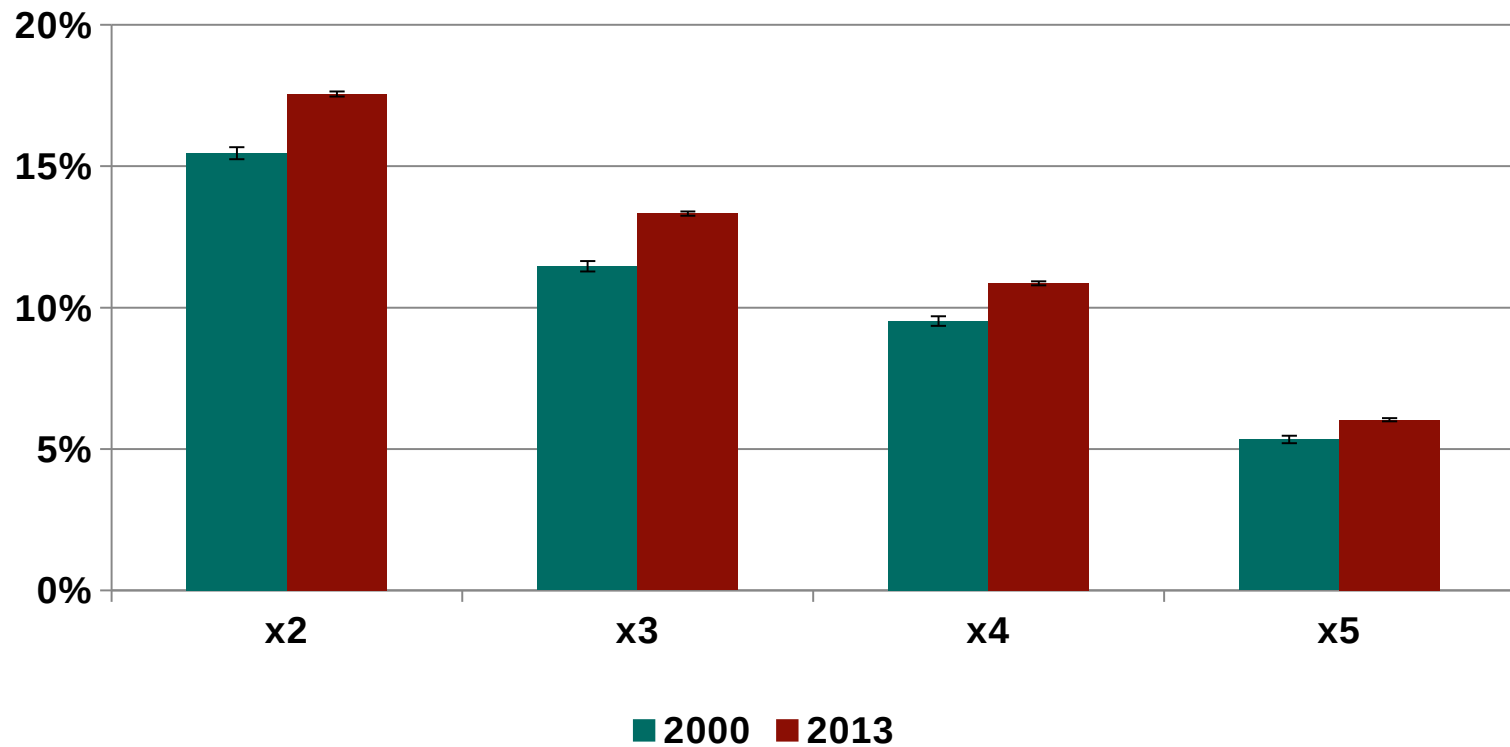
<b><i>Evidence</i></b>	<b>Number of teenage-type jobs</b>	<b>Immigrants in teenage-type jobs</b>	<b>High school dropouts in teenage-type jobs</b>
<i>Supply: Education</i>	↓		
<b><i>Demand: Unskilled Labor</i></b>			↓
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<i>Supply: Education</i>	Red	Light Gray	Light Gray
<b><i>Demand: Unskilled Labor</i></b>	Green	Light Gray	Red
<i>Demand: Immigrants</i>	Green	Light Green	Light Gray
<b><i>Demand: Other Adult Workers</i></b>	Green	Light Gray	Light Gray
<i>Wage Floor: Minimum Wage</i>	Red	Light Gray	Light Gray

# *“Teenage Jobs” are Up as a Percentage of Overall Jobs*

Percentage of Workers in “Teenage Jobs”, From Least to Most Restrictive Definition of Teenage Jobs



# ***Evidence Regarding Teenage-Type Jobs Supports Demand Explanation In General, Immigration Explanation Specifically***


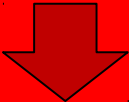


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<b><i>Demand: Unskilled Labor</i></b>	Green	Grey	Red
<i>Demand: Immigrants</i>	Green	Green	Grey
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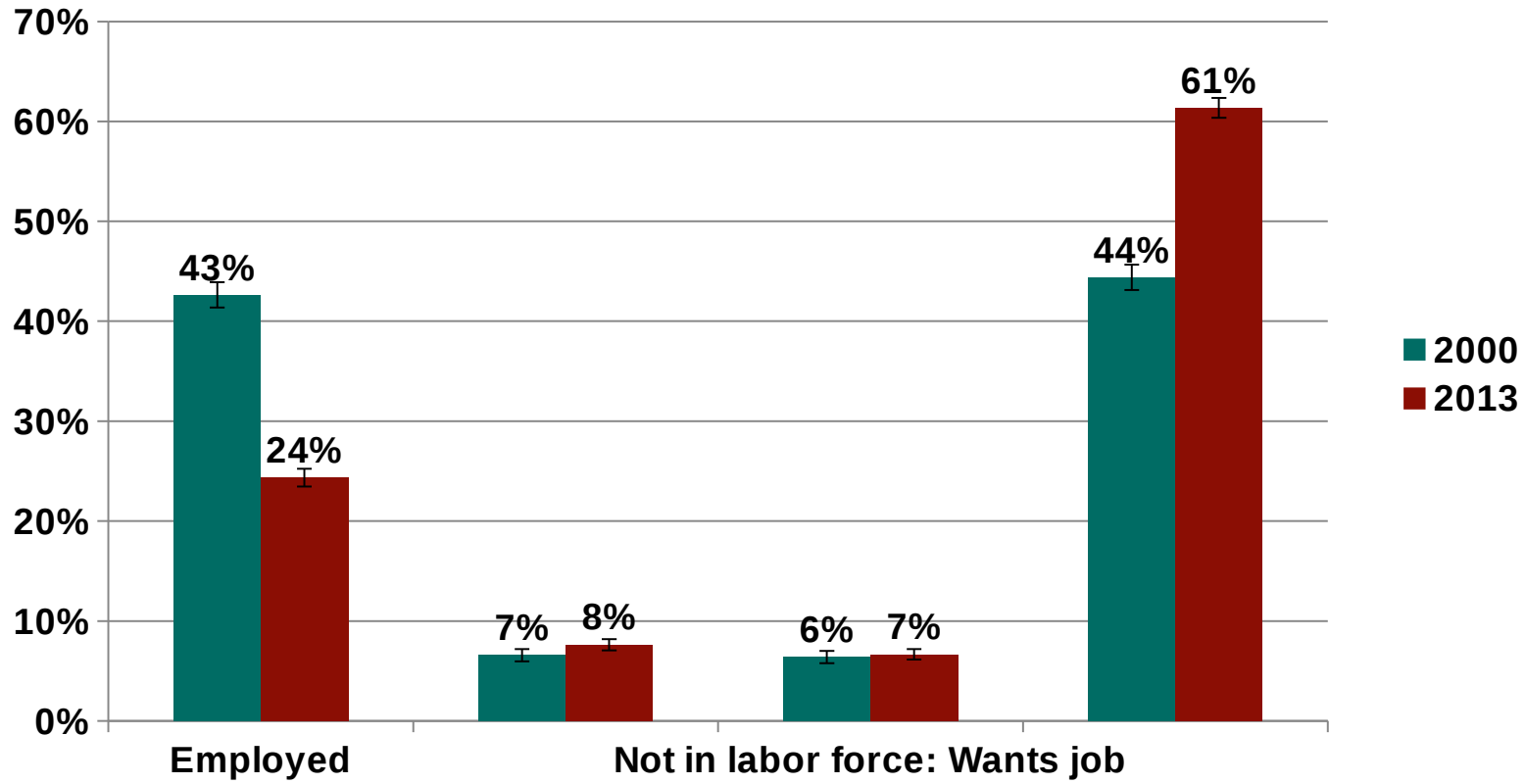
# Evidence Regarding Teenage Wages is Mixed

<i>Evidence</i>	Self-reported “wanting to work”, CPS	Self-reported “wanting to work”, MTF	Parental work preferences, MTF	Teenage wages overall	Teenage wages relative to minimum wage
<i>Supply: Education</i>					
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# *Dramatically More Teens Say They Don't Want Jobs*



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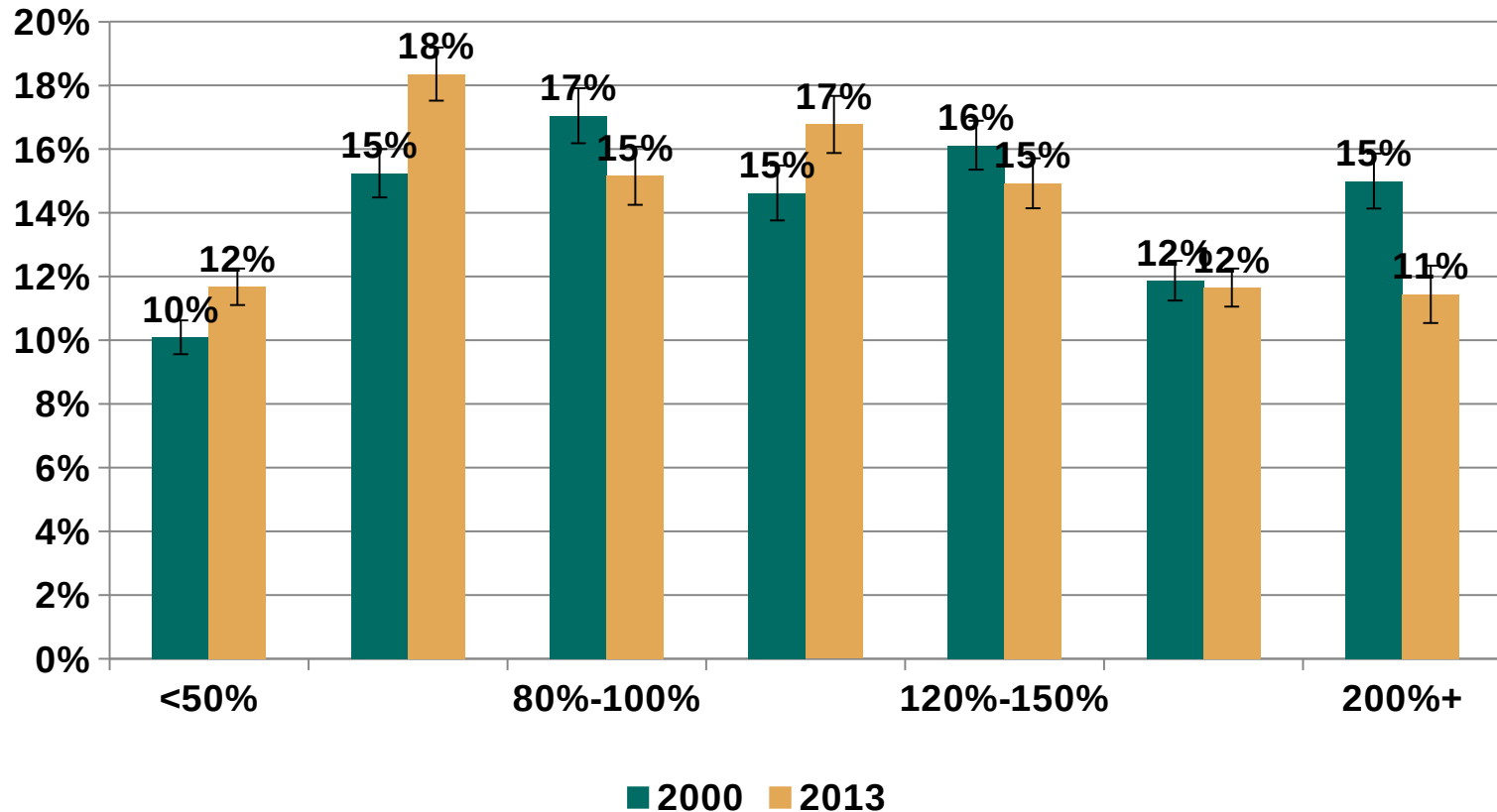
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<i>Supply: Education</i>	[Grey]	[Grey]	[Grey]	[Yellow]	[Grey]
<i>Demand: Unskilled Labor</i>					
<i>Demand: Immigrants</i>					
<i>Demand: Other Adult Workers</i>					
<i>Wage Floor: Minimum Wage</i>	[Red]	[Yellow]	[Green]	[Yellow]	[Yellow]

# Many Teens Earn Less than Minimum Wage; Some Spike Just At/Above Minimum Wage





# Overall, Strong Evidence for Supply Explanation, Plus Some Type of Demand Shift

Evidence	Education	Unskilled Labor	Immigrants	Other Adults	Minimum Wage
School status	Green				White
College intentions	Green				White
Time spent on academic activities	Yellow				White
School vs. work status	Red	Green			White
Number of teenage-type jobs	Red	Green	Green	White	Red
Immigrants in teenage-type jobs	White	White	Green	White	White
High school dropouts in teenage-type jobs	White	Red	White	White	White
Self-reported "wanting to work", CPS	White	White	White	White	Red
Self-reported "wanting to work", MTF	White	White	White	White	Yellow
Parental work preferences, MTF	White	White	White	White	Green
Teenage wages overall	Yellow				White
Teenage wages relative to minimum wage	White				Yellow
School status (model)	Green	Yellow			White
High-school dropouts (model)	White	Yellow	White	White	White
Immigrants (model)	White	White	Yellow	White	White
Education/wage stratification (model)	Green	White			White
Minimum wage (model)	White				Yellow

# *Today's Talk*

- **Explanations and predictions**
- **Summarizing the evidence**
- **Evaluating current programs based on findings**

# ***Overall Drop in Teen Employment: Not a Problem***

- **Teenagers are focusing more on school**
- **The average effect of working on later employment/educational outcomes is weak**

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- **The average effect of working on later employment/educational outcomes is weak**

***ever, some teenagers are  
er in school nor working***

# ***Teenage Employment Programs Vary Significantly in Terms of Audience***

- **The Work Opportunity Tax Credit (federal)**
- **Direct-hire and public/private partnership programs (local)**
- **Residential programs focusing on life, vocational, and academic skills (federal)**

# ***Programs are Ideal for Evaluation***

- Lottery-based selection**
- Locally-variant elements**

## ***But Actual Evaluation is Limited, Results are Mixed***

- **No evaluation of the Work Opportunity Tax Credit and its effect on teenagers**
- **Limited evaluation of local programs**
- **Residential programs (Job Corps and National Guard Youth ChalleNGe) are best-evaluated**



# ***Recommendations***

- **Increase program evaluation of local programs**
- **Change program elements/re-allocate funds across programs based on results**



A silhouette of a person wearing a cap and pushing a trash cart with a large wheel and a handle. The cart is filled with various items, including a long-handled tool and a bag. The scene is set against a dramatic sunset sky with orange and yellow hues. The sun is low on the horizon, and the sky is filled with clouds. The overall mood is somber and reflective.

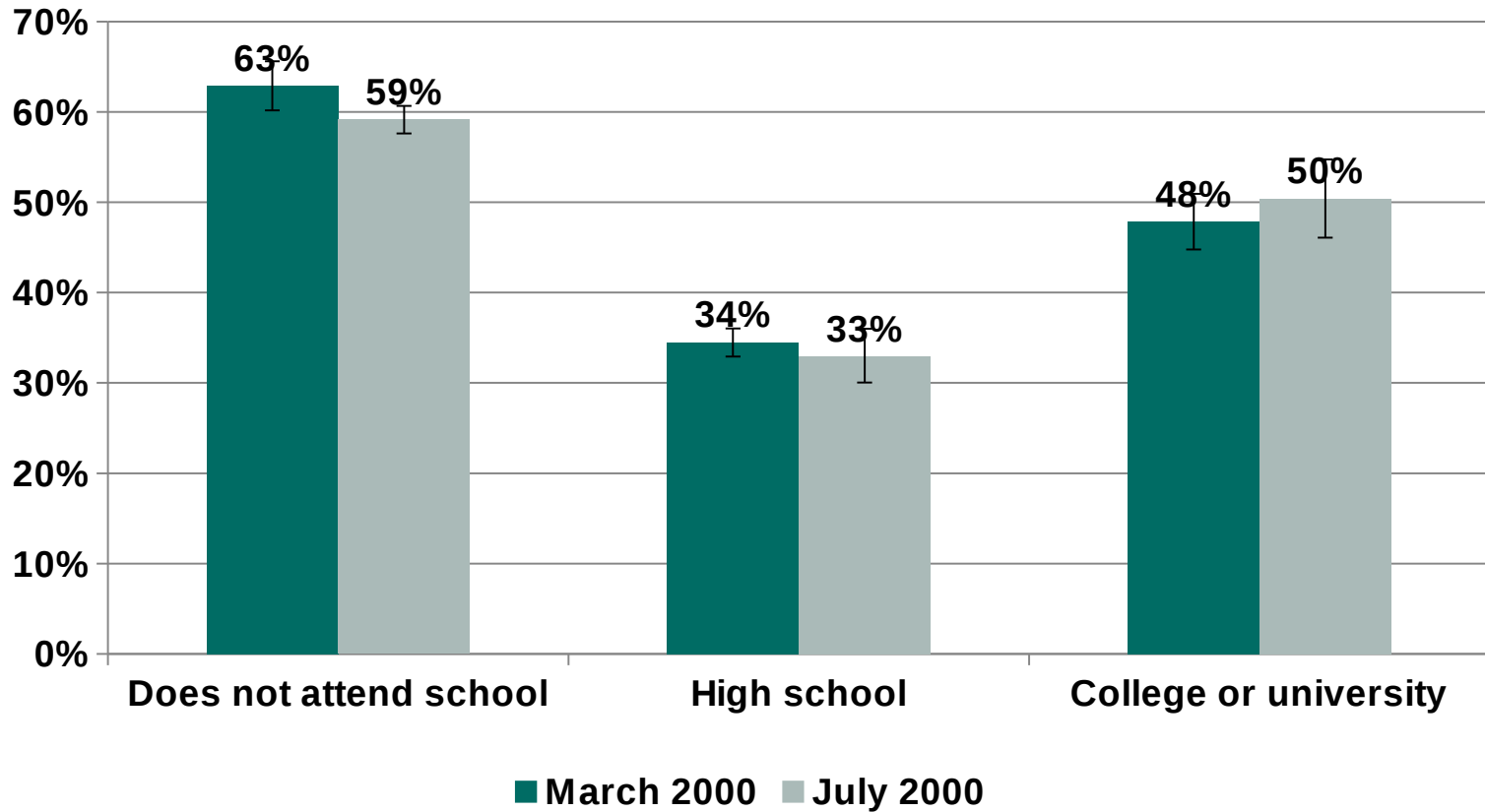
# *Discussion*

# ***Backup Slides***

- **Background on teenage employment**
- **Specific evidence slides**
- **Technical slides**
- **Definition of employment**

# ***Background on teenage employment***

# *In 2000, Fewer Than Half of Teenagers Worked Either School-Year or Summer*



# ***Teenagers Worked Jobs That Require Little Training***

## **Ten Occupations with the Most Teenagers**

**Cashiers**

**Retail sales clerks**

**Cooks, variously defined**

**Waiter/waitress**

**Laborers outside construction**

**Waiter's assistant**

**Stock and inventory clerks**

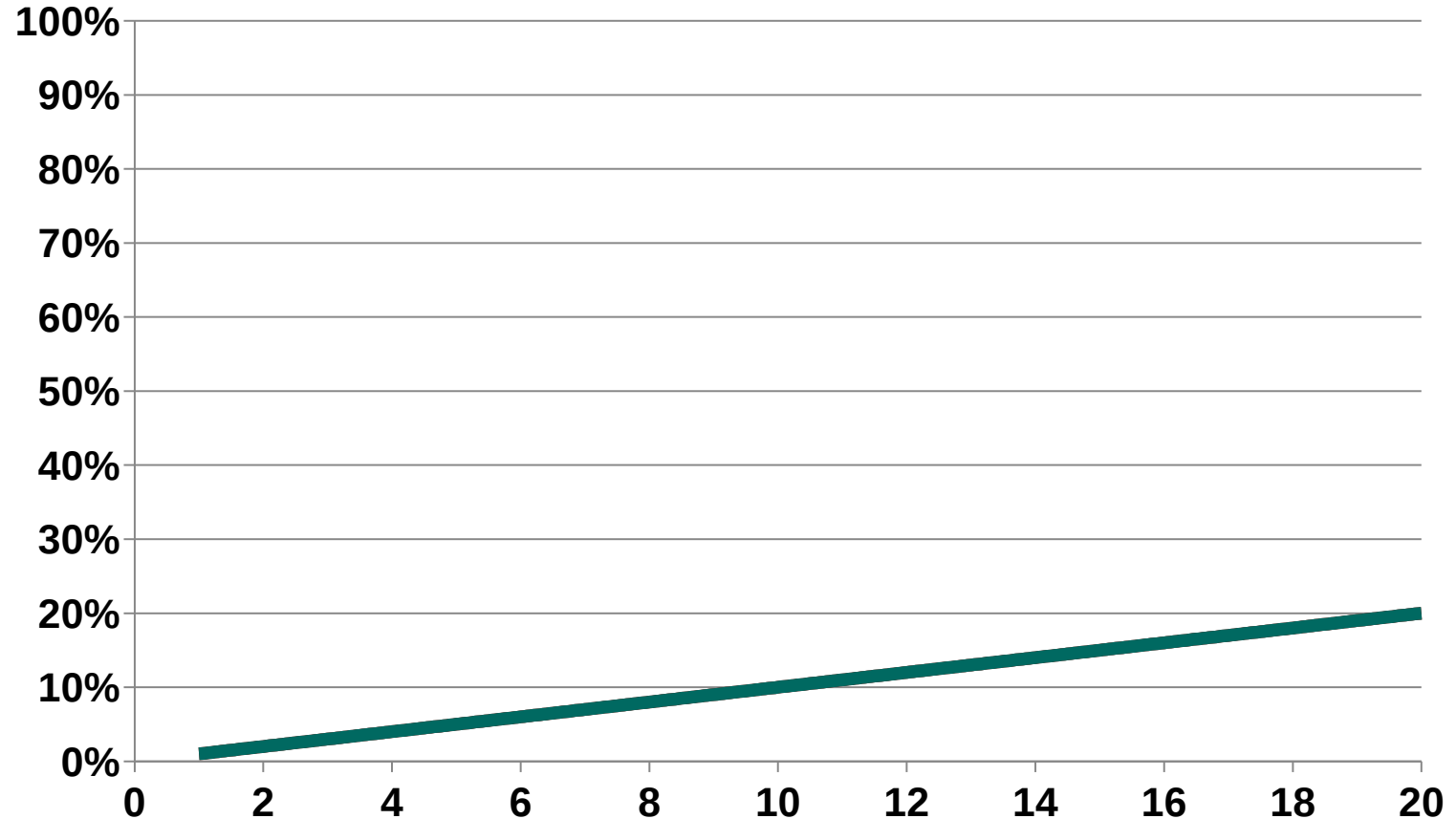
**Misc food prep workers**

**Salespersons, not elsewhere classified**

**Child care workers**

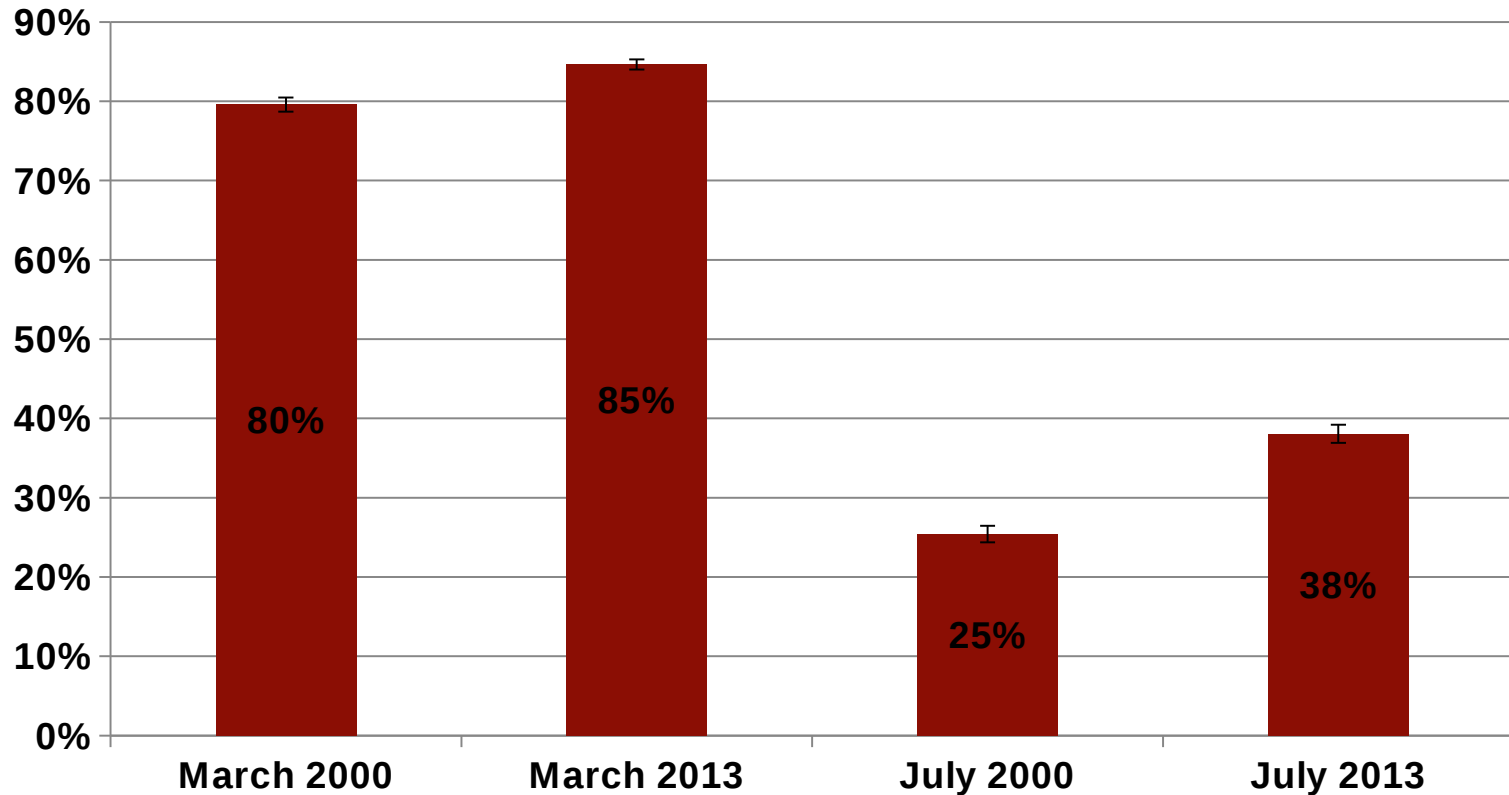


# *Teenage Hourly Wages Were Very Low*



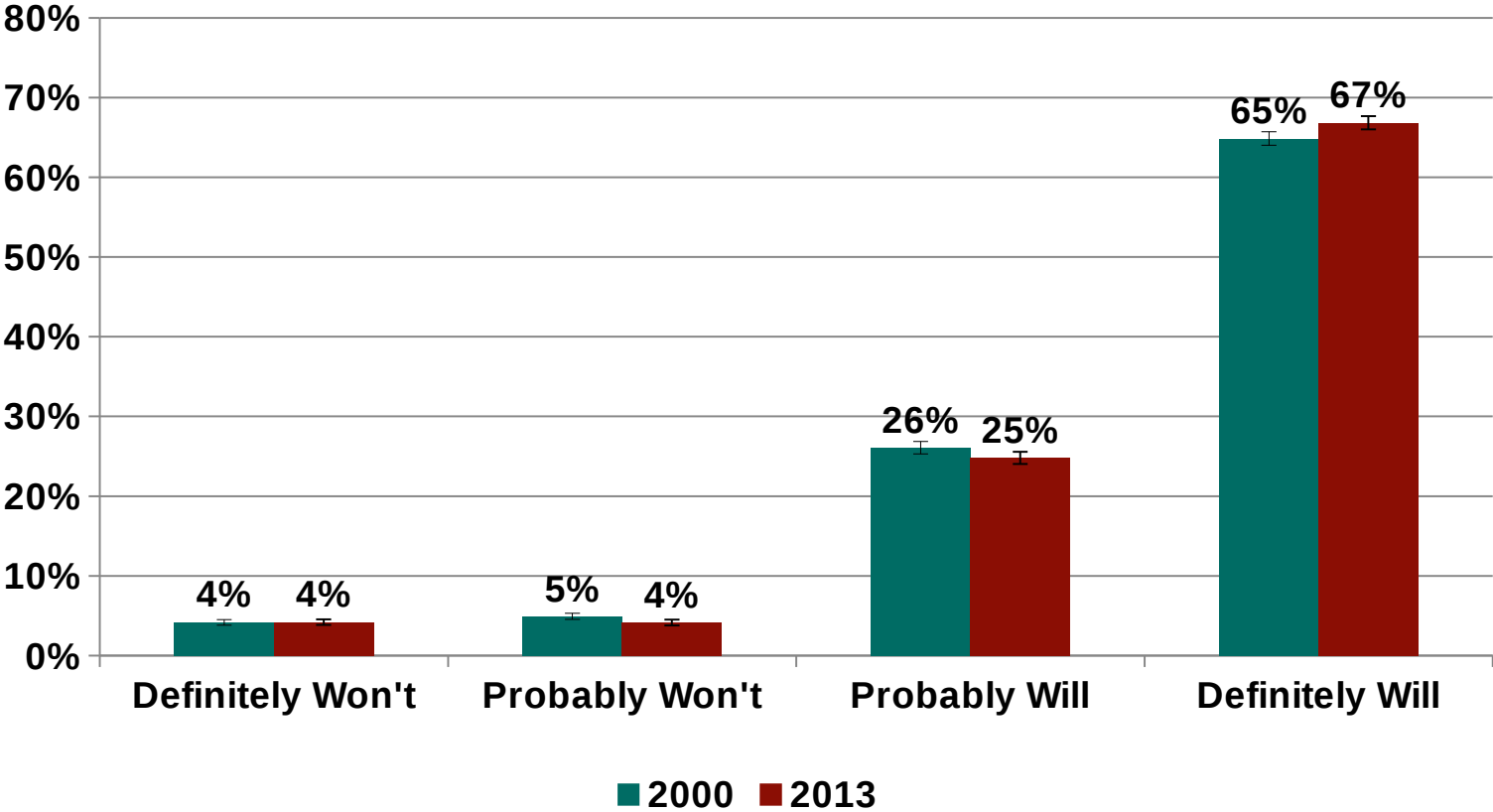
# ***Specific Evidence Slides***

# *More Teenagers in School, Particularly in Summer*

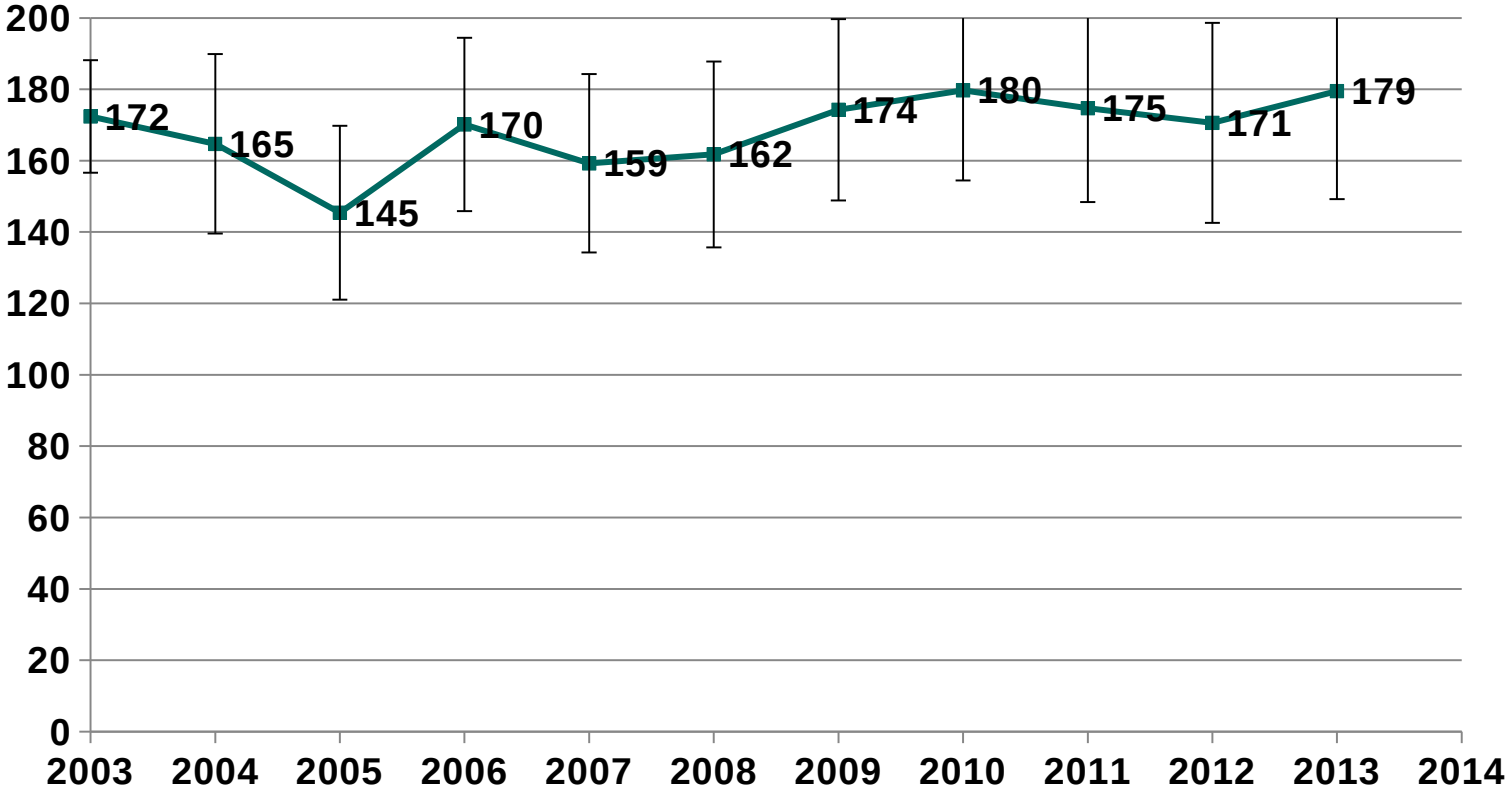




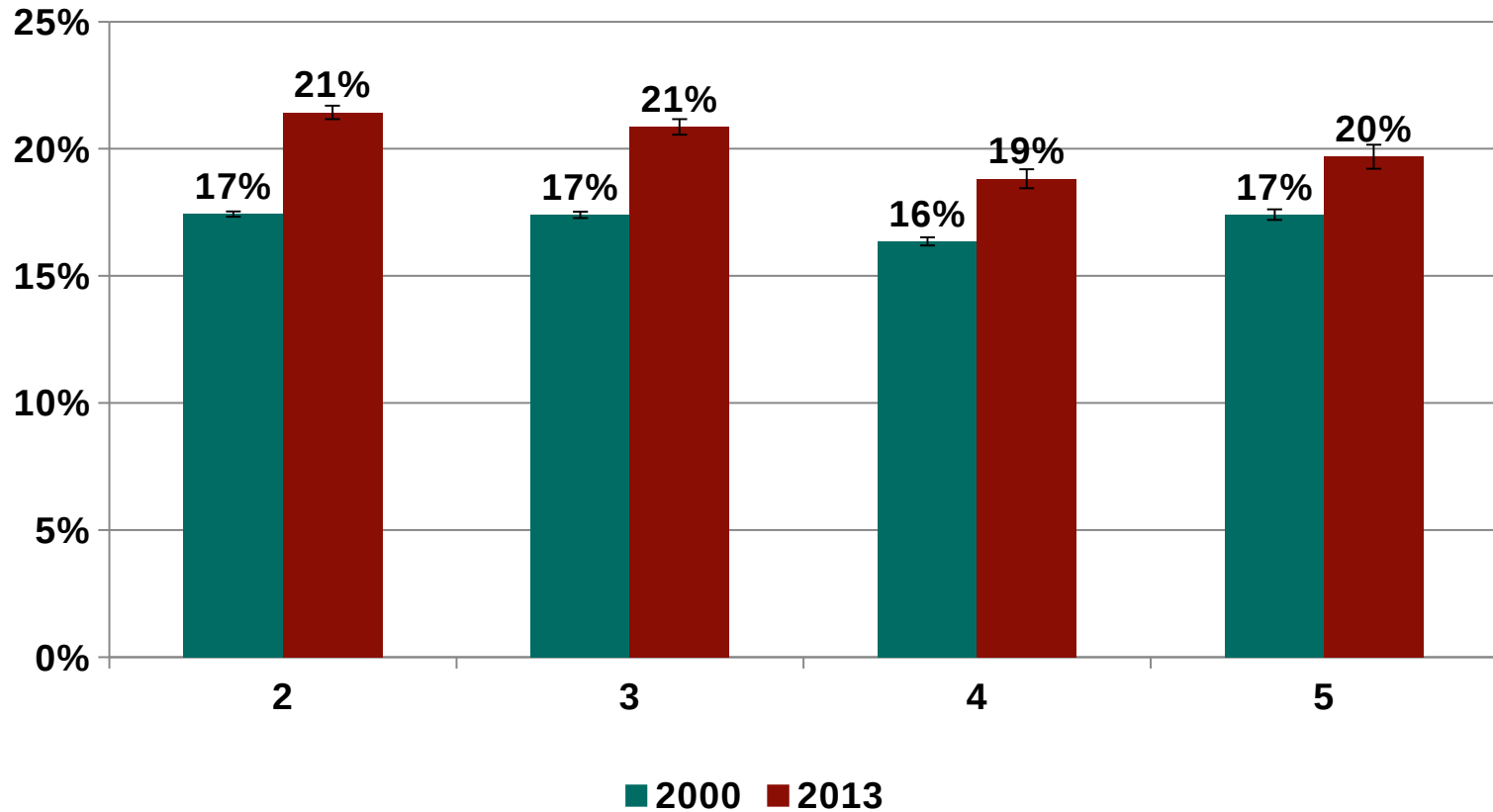
# More Teenagers Report College Plans



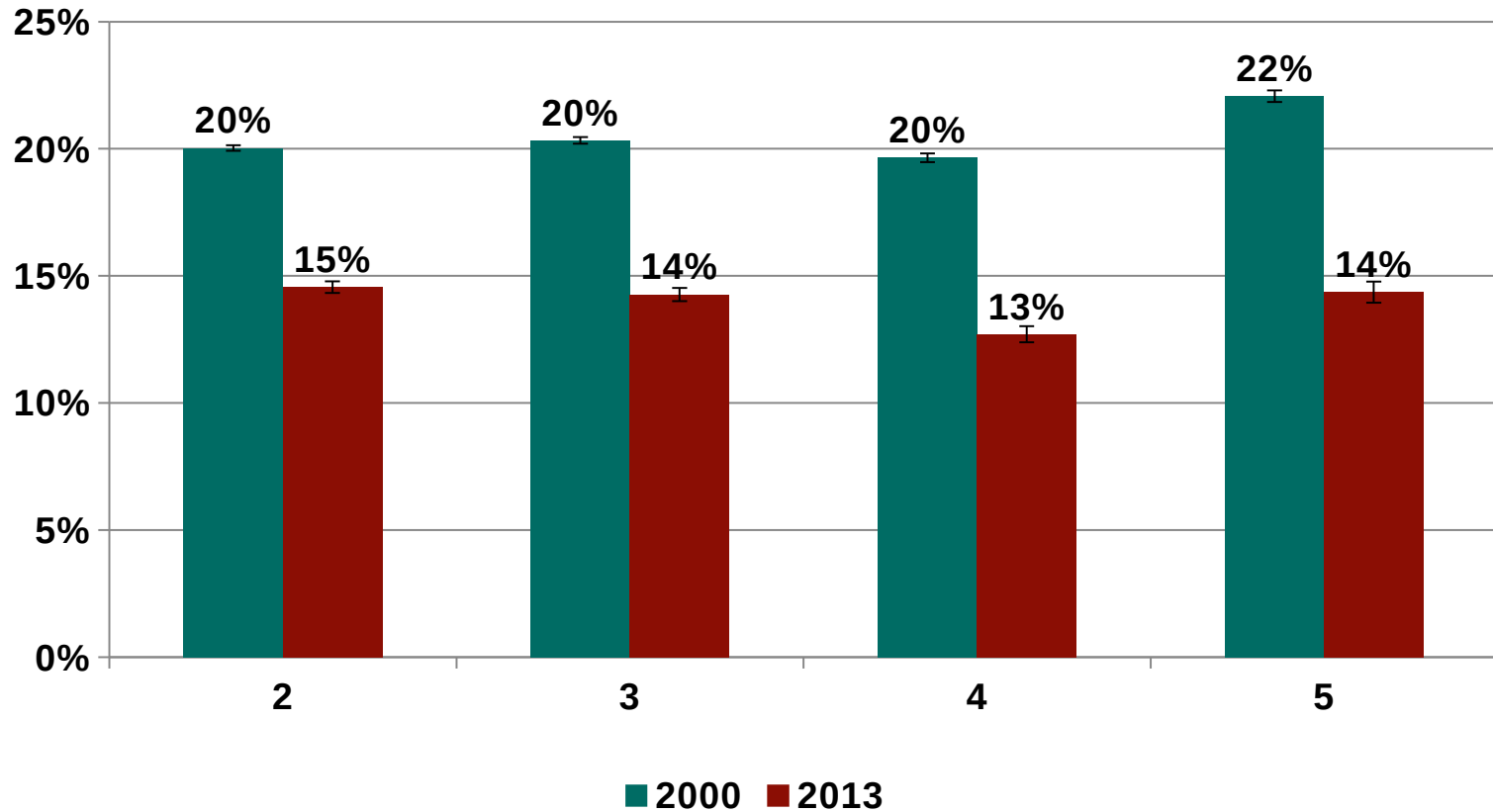
# *No Change in Minutes/Day on Academic Activities*



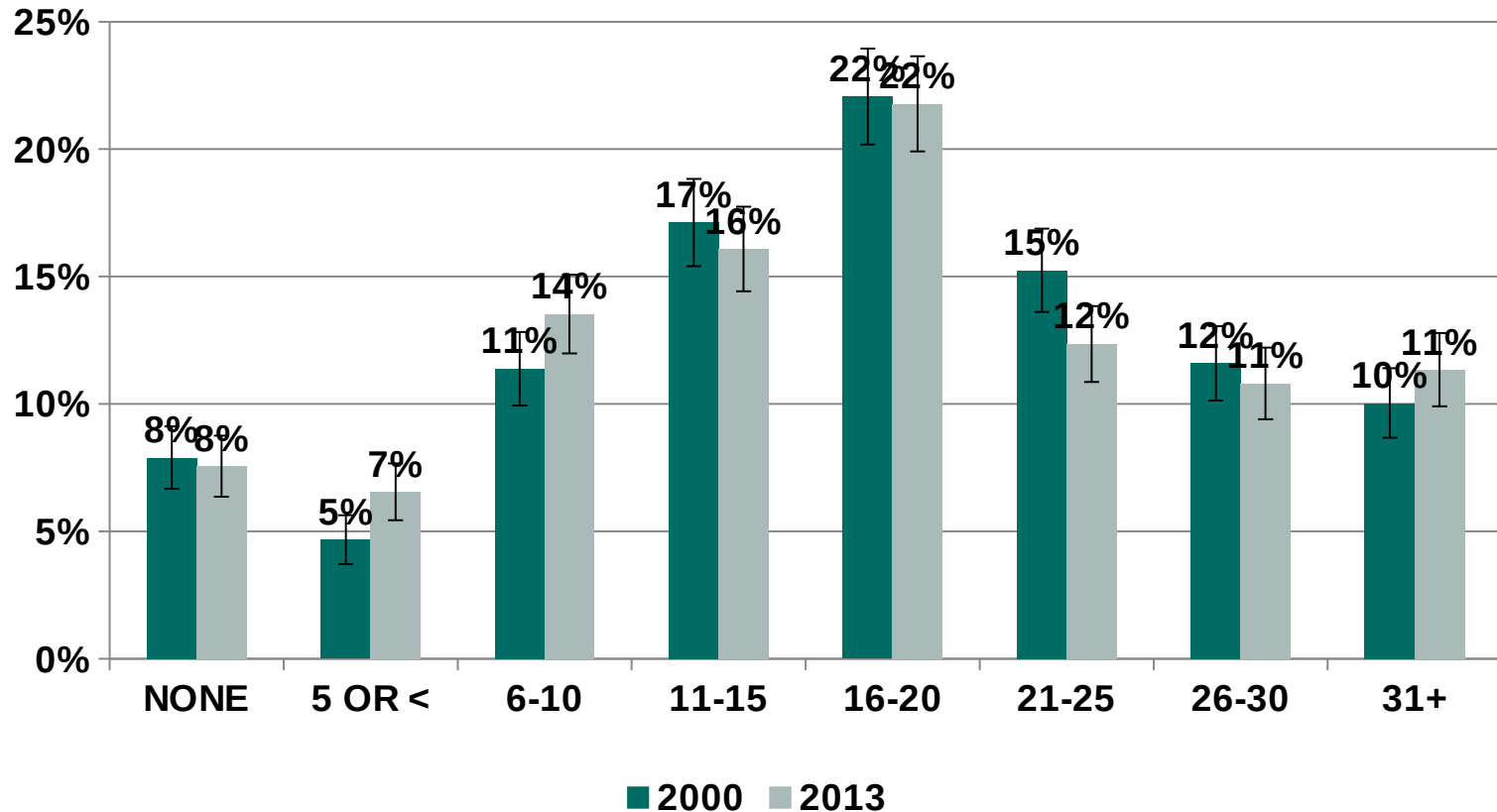
# *Proportion of Immigrants Among Adults in Teen Jobs Has Grown*



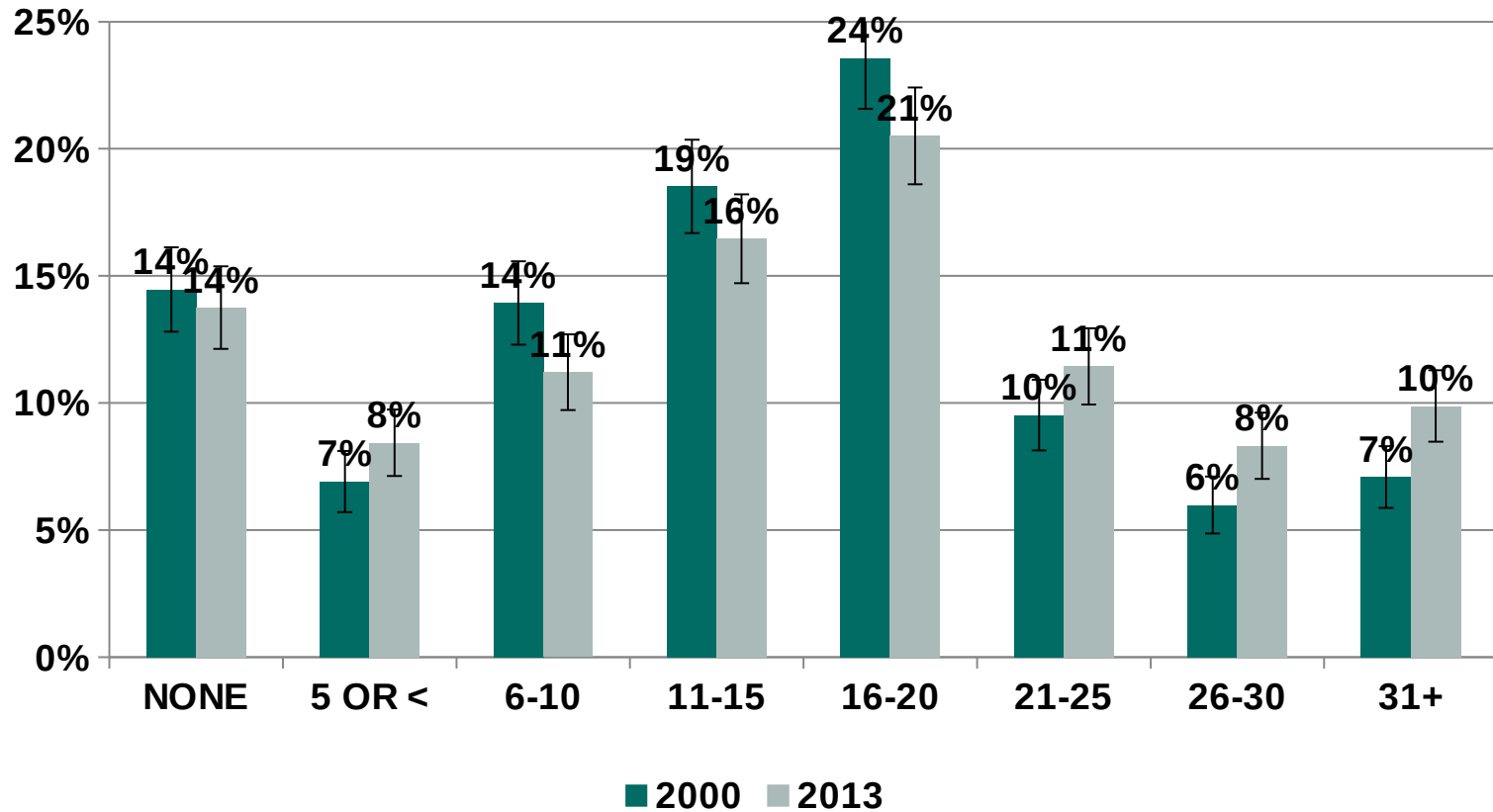
# *Proportion of HS Dropouts Among Adults in Teen Jobs Has Shrunk*



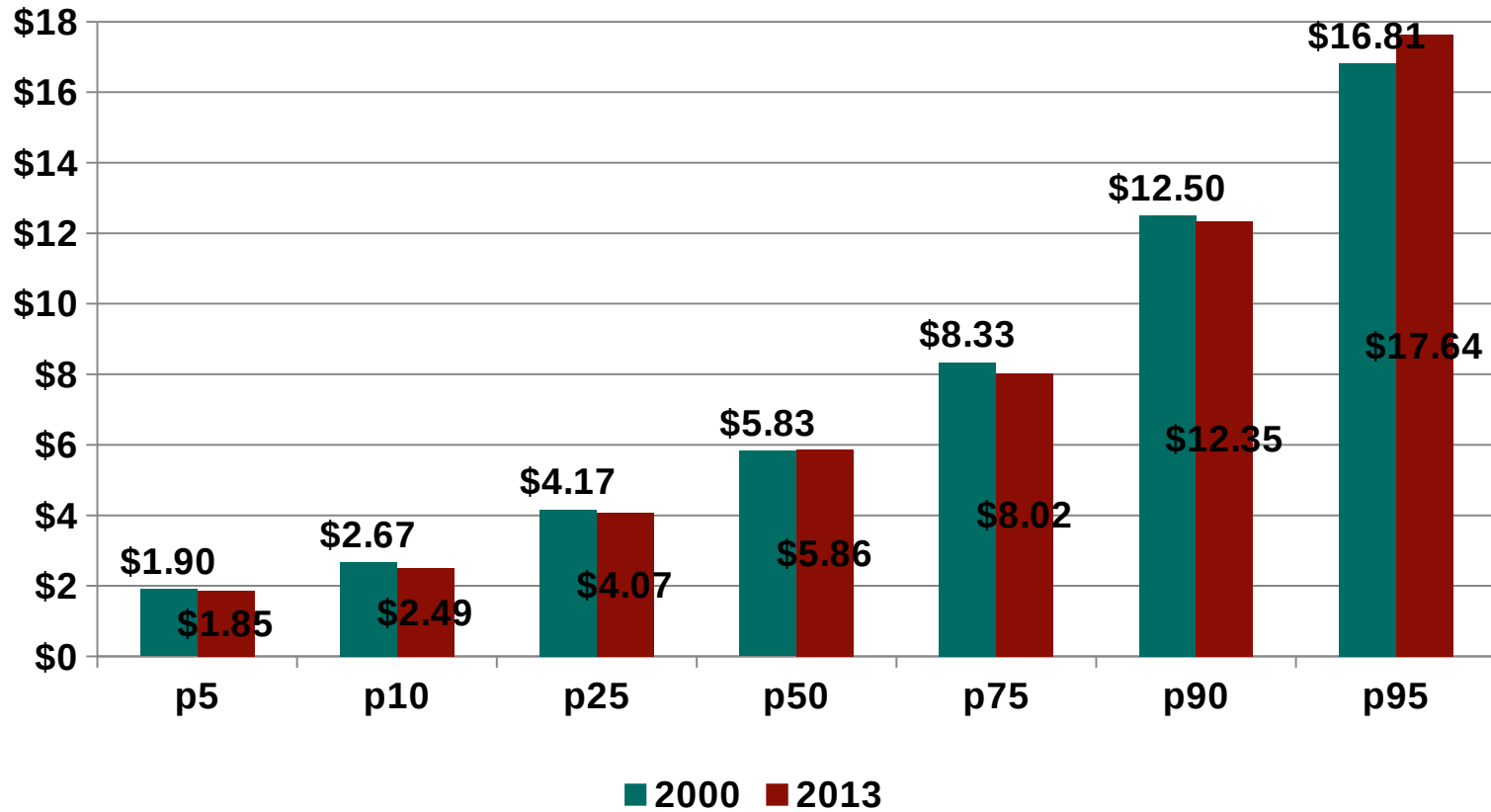
# *No Change in Hours 12th-Graders Report Preferring to Work During the School Year*



# *But 12th-Graders Report Their Parents Want Them to Work More Hours*



# Teenage Wages Have Been Stagnant



# Results of Statistical Model

VARIABLES	Composition	Coefficients	Summary
<b>In School</b>	0.0142*** (0.000702)	0.0496*** (0.00945)	
<i>Proportion of HS Dropouts (County)</i>	-0.0143 (0.00411)	0.0101 (0.0126)	
<i>Proportion of HS Dropouts (State)</i>	-0.0103 (0.00702)	0.0256 (0.0228)	
<i>Ratio HS Dropout: College Grad Income (County)</i>	-0.00243 (0.00331)	0.00245 (0.00256)	
<i>Ratio HS Dropout: College Grad Income (State)</i>	0.0217* (0.00700)	-0.00983 (0.00728)	
<i>Ratio HS Grad: College Grad Income (County)</i>	0.00195 (0.00136)	-0.00840 (0.00692)	
<i>Ratio HS Grad: College Grad Income (State)</i>	-0.00580 (0.0131)	0.0503 (0.0376)	
<i>Proportion Unemployed (County)</i>	0.0120 (0.00721)	0.00280 (0.0139)	
<i>Proportion Unemployed (State)</i>	0.0336 (0.0205)	-0.0551 (0.0478)	
<i>Proportion Immigrants (County)</i>	0.00634 (0.00329)	-0.00306 (0.00800)	
<i>Proportion Immigrants (State)</i>	0.00547 (0.00552)	0.0216 (0.0138)	
<i>Minimum Wage</i>	0.0151 (0.0278)	0.0724 (0.101)	
<b>Composition</b>			0.0775** (0.0257)
<b>Coefficients</b>			0.0546(.0483)
<b>Total</b>			0.132***(0.00544)
<b>Observations</b>	977,228	977,228	977,228

Standard errors, based on clustering at the county level, are in parentheses  
 5% Census sample 2000; ACS 2013; CPS 1999 and 2013; State and federal minimum wages  
 \*\*\* p<0.01, \*\* p<0.05, \* p<0.1 (Based on Benjamini-Hochberg FDR)



# *Technical Explanations*

- **Equations for model**
- **Model results in detail**
- **Benjamini–Hochberg FDR**
- **Clustering on county**
- **Endogeneity/lag**

# ***Explaining the Formal Decomposition Model***

$$\begin{aligned} & \overline{Y}_{2000} - \overline{Y}_{2013} \\ &= \left[ \overline{F(X_{2000}\beta_{1;2000} + Z_{[1999]}\beta_{2;1999} + A_{[1999]}\beta_{3;1999})} \right. \\ & \quad \left. - \overline{F(X_{2013}\beta_{1;2000} + Z_{[2012]}\beta_{2;1999} + A_{[2012]}\beta_{3;1999})} \right] \\ &+ \left[ \overline{F(X_{2013}\beta_{1;2000} + Z_{[2012]}\beta_{2;1999} + A_{[2012]}\beta_{3;1999})} \right. \\ & \quad \left. - \overline{F(X_{2013}\beta_{1;2013} + Z_{[2012]}\beta_{2;2012} + A_{[2012]}\beta_{2012;})} \right] \end{aligned}$$

# Changes Among Teenagers from 2000 to 2013

Variable	2000		2013	
	Mean	SD	Mean	SD
employed	0.41	0.49	0.28	0.45
In School	0.80	0.40	0.85	0.35
Proportion of HS Dropouts (County)	0.14	0.06	0.11	0.05
Proportion of HS Dropouts (State)	0.13	0.04	0.11	0.03
Ratio HS Dropout: College Grad Income (County)	0.26	.27	0.11	0.25
Ratio HS Dropout: College Grad Income (State)	0.17	0.09	0.09	0.08
Ratio HS Grad: College Grad Income (County)	0.57	.21	0.42	0.31
Ratio HS Grad: College Grad Income (State)	0.50	0.06	0.40	0.06
Proportion Unemployed (County)	0.04	0.02	0.08	0.03
Proportion Unemployed (State)	0.04	0.01	0.08	0.02
Proportion Immigrants (County)	0.12	0.12	0.16	0.13
Proportion Immigrants (State)	0.13	0.10	0.17	0.10
Minimum Wage	5.30	0.33	7.57	0.45
n	809,014		172,957	
weighted n	15,956,257		17,107,683	
school	1.80		school	1.85

5% Census sample 2000; ACS 2013; CPS 1999 and 2013; State and federal minimum wages □

# Modeling Employment in 2000 and 2013

VARIABLES	2000	2013
In School	-0.811*** (0.0240)	-0.949*** (0.0292)
Proportion of HS Dropouts (County)	-1.936*** (0.453)	-2.423*** (0.594)
Proportion of HS Dropouts (State)	-0.586 (0.671)	-1.837 (1.235)
Ratio HS Dropout: College Grad Income (County)	0.0353 (0.0542)	-0.0793 (0.0984)
Ratio HS Dropout: College Grad Income (State)	0.606** (0.233)	1.206*** (0.356)
Ratio HS Grad: College Grad Income (County)	-0.0411 (0.0711)	0.0624 (0.0356)
Ratio HS Grad: College Grad Income (State)	0.369 (0.462)	-0.282 (0.639)
Proportion Unemployed (County)	-1.182 (0.800)	-1.360 (0.818)
Proportion Unemployed (State)	-7.453*** (2.460)	-3.901 (2.387)
Proportion Immigrants (County)	-0.806** (0.324)	-0.706 (0.354)
Proportion Immigrants (State)	0.0715 (0.449)	-0.593 (0.596)
Minimum Wage	0.0181 (0.0686)	-0.0316 (0.0578)
Constant	1.473*** (0.343)	2.098*** (0.442)
Observations	805,850	171,378

Standard errors, based on clustering at the county level, are in parentheses

5% Census sample 2000; ACS 2013; CPS 1999 and 2013; State and federal minimum wages

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1 (Based on [Benjamini-Hochberg FDR](#))

# The Model in More Detail

VARIABLES	Composition	Coefficients	Summary
In School	11%***	38%***	
Proportion of HS Dropouts (County)	-11%	8%	
Proportion of HS Dropouts (State)	-8%	19%	
Ratio HS Dropout: College Grad Income (County)	-2%	2%	
Ratio HS Dropout: College Grad Income (State)	16%*	-7%	
Ratio HS Grad: College Grad Income (County)	1%	-6%	
Ratio HS Grad: College Grad Income (State)	-4%	38%	
Proportion Unemployed (County)	9%	2%	
Proportion Unemployed (State)	25%	-42%	
Proportion Immigrants (County)	5%	-2%	
Proportion Immigrants (State)	4%	16%	
Minimum Wage	11%	55%	
Composition			59%
Coefficients			41%

5% Census sample 2000; ACS 2013; CPS 1999 and 2013; State and federal minimum wages □  
 \*\*\* p<0.01, \*\* p<0.05, \* p<0.1 (Based on Benjamini-Walberg FDR)

# ***Benjamini–Hochberg FDR***

- **Type I error: false positives**
- **With one hypothesis test, the expected probability of a false positive is  $\alpha$**
- **The adjustment brings the expected proportion of false discoveries back to  $\alpha$**
- **Procedure**
  - **Rank p-values**
  - **Multiply p-values by rank/number of tests**
  - **Fail to reject hypotheses with adjusted p-values  $> \alpha$**

# *Clustering on County*

- **County and state-level data**
- **Assumptions of independence: violated**
- **Clustering adjusts standard errors for intragroup correlation**

# ***Endogeneity/Lag***

- **My dependent variable of interest is employment in 2000 and 2013**
- **I interested how county- and state-level variables statistically explain variation in employment**
- **One concern is that teenage employment, or factors associated with it, could be affecting my independent variables**
- **One solution for that, which I implement, is the lag: using previous-year variables on the county- and state level**
- **The idea is that teenage employment in 2013 could not be retroactively causing, for instance, adult unemployment rate in 2012**



# Theoretical Model

$$(1) \max u^i(\text{Leisure}_1, \text{Income})$$
$$\text{wrt } \text{Work}^i_1, \text{School}^i$$

s.t.

$$(2) \text{Leisure}^i_1 = 24 - \text{Work}^i - T * \text{School}^i$$

$$(3) \text{Income}^i = \text{Wage}_1 (24 - \text{Leisure}^i_1 - T * \text{School}^i) + \text{Base Income} + P^i(\text{School Income Premium} * \text{School}^i)$$

# ***Respondents are Employed If...***

- **They are active duty members of the armed forces**
- **They hold paid jobs in the civilian workforce and are working this week**
- **They hold paid jobs in the civilian workforce and aren't working this week because they're sick or on vacation**
- **They work for a family business**

# ***Examples of Non-Employed Respondents Include...***

- **Teenagers holding unpaid internships for businesses not run by their family**
- **Teenagers who are working intermittently (for instance, babysitting or mowing lawns) and have no work in the week of the survey**



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