

Driving, Dropouts, and Drive-throughs: Mobility Restrictions and Teen Human Capital

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Teen Human Capital Decisions

- Teens make big, lasting human capital decisions
 - Work part-time or focus on school?
 - Finish HS or dropout?
- Complicated by the interrelated nature of teen choices regarding work, schooling, and leisure
 - E.g., making employment less desirable/accessible may have an indirect effect on decision to complete schooling
- Policies intended to affect only 1 teen activity may impact all 3

Graduated Drivers Licensing

- Teen drivers experience high fatality risk from driving
- Starting in the mid 1990s, most states adopted **graduated driver licensing (GDL)** laws
- These laws: (i) limited intermediate stage licenses to older (>16) teens, (ii) restricted nighttime driving, and/or (iii) restricted the number of passengers with a teen driver
- Such restrictions reduced teenage (especially 16-year-old) driving-related fatalities

Research Question

This paper explores the consequences of a policy that was only intended to impact teen car safety (GDL laws) on **educational attainment** and teen **labor force participation**

- GDL laws limit teen mobility
- This should have a direct, negative effect on schooling, work, and leisure
 - harder to commute to school → lower attendance → more HS dropouts
- But may also have indirect effects thru complementarity/substitutability of activities
 - limit access to leisure activities → higher school attendance → fewer HS dropouts

Contribution

1. Use reduced-form methods to estimate *total effect* of GDL laws on HS dropout rates and teen employment
 - Quasi-experimental variation in timing of GDL law adoption
 - Combine with variation in compulsory schooling (CS) laws to create **Triple-Diff research design**
2. Develop a multiple discrete choice model to rationalize these findings
 - Model lets us **separate the direct effect** of the policy on an activity **from indirect effects** due to activities being substitutes or complements

Data & Empirical Strategy

Data:

- We develop a database of GDL laws from 50 states + DC for 1990-2017
- Link to:
 - Current Population Survey Annual Social and Economic Supplement (CPS)
 - Compulsory Schooling (CS) law data on **minimum school-leaving age**
- **Limit sample to 16-year-olds** (most impacted by GDL laws)

Triple-Difference Research Design:

1. compare states before and after GDL law adoption
2. compare states that adopt early vs. late in analysis period
3. compare states where teens dropout behavior is unrestricted vs. states where teens face a legal requirement to stay in school (via CS laws)

$$NotInSchool_{ist} = \beta_1 GDL_{st} + \beta_2 CS_{st} + \beta_3 GDL_{st} * CS_{st} + X'_{it}\nu + Z'_{st}\mu + D_s + D_t + \epsilon_{ist}$$

Estimation:

- $NotInSchool_{ist} = 1$ if teen not enrolled in school in preceding week
- $GDL_{st} = 1$ if min unrestricted driving age >16 (driving is restricted)
- $CS_{st} = 1$ if min school-leaving age ≤ 16 (dropout is allowed)
- X_{it} = gender, race/ethnicity indicators, mother's education, presence of father in household, receipt of SNAP benefits
- Z_{st} = the state's unemployment rate, log min wage
- Probit MLE with standard error clustering at the state-level

Reduced-Form Estimation Results

	Not In School = 1	
	(1)	(2)
Min. Unres. Driving Age >16 (β_1)	0.0022 (0.0042)	0.0014 (0.0039)
School-Leaving Age ≤ 16 (β_2)	0.0197*** (0.0048)	0.0182*** (0.0047)
Min. Unres. Driving Age >16 × School-Leaving Age ≤ 16 (β_3)	-0.0129*** (0.0048)	-0.0119** (0.0048)
Effect of GDL if School-Leaving Age ≤ 16 ($\beta_1 + \beta_3$)	-0.0107** (0.0050)	-0.0105** (0.0049)
Controls	-	Y
Obs	75,196	75,196

* p < 0.10, ** p < 0.05, *** p < 0.01

Effect of GDL Laws on 16-year-old Dropout:

- $\beta_1 \approx 0$: No effect of GDL laws in states where dropout not allowed (placebo test)
- $\beta_1 + \beta_3$: In states where dropout is legal, restricting teen mobility leads to a 1.1pp reduction in high school dropouts (28% at mean)

Interpretation:

- Negative estimate of the total effect indicates that:
 - Direct effects of GDL laws (making it harder to commute to school) must be completely offset by indirect effects
 - Indirect effects could be from reduced access to work, leisure, or both

Effect of GDL Laws on 16-year-old Labor Force Participation:

- Same triple-diff model with indicator for LFP as dependent variable
- In states where dropout is legal: raising min drive age to > 16 reduces probability of 16-yo participating in LF by 1.7pp (7% at mean)

These estimates suggest that teen decisions regarding work and school are linked. What is the role of leisure? We next develop a structural model to rationalize these findings.

Multiple Discrete Choice Model

- Teens choose work, school, both activities, or neither activity
- Allow work & school to act as complements or substitutes in utility equations
- Identification comes from exclusion restrictions:
 - Compulsory schooling laws only enter into utility of schooling equation
 - State minimum wage & unemployment rate only enter into work equation
- Normalize value of outside option with additional sign restrictions
 - Set identifies indirect utility cost of GDLs on "leisure" activities
- Estimate using GHK Simulator

Model Results

- Parameter estimates show that **school & work are complements** for teens
- Simulate counterfactuals to replicate total effects from reduced-form and **decompose into direct channels and indirect channels**

Decomposition Results:

- Very little of the effect of GDL on dropout is due to substitution away from employment
- **Substitution away from leisure** is causing reduction in HS dropout
- The effect of GDL on employment is almost entirely a direct effect (it's harder to commute to work)

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