



# *New Evidence on Income Volatility and Financial Distress*

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## **The Demographics of Delinquency: Tipping Points or Tip of the Iceberg?**

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These comments do not necessarily represent the views of the Federal Reserve Bank of St. Louis or the Federal Reserve System.



## *Our Approach to the Demographics of Delinquency*

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- We study two probit models of delinquency using data from Survey of Consumer Finances, 1989-2013.
- The standard “post-racial” or “demographics-don’t-matter” (DDM) model
  - Families choose their delinquency risk.
  - Those living closer to the edge (higher risk) are more subject to “tipping points” into delinquency.
- A model of structural racism or the “peer-groups-matter” (PGM) model
  - Opportunities and choice sets differ by age, education and race/ethnicity.
  - High observed delinquency rates are the “tip of the iceberg” of greater background distress and risk.



## *Preview of Conclusions and Implications*

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- **Credit histories/credit scores do not fully capture the roles played by race and ethnicity.**
  - **Minority—especially black—DQ rates are higher than predicted by credit scores.**
  - **If race and ethnicity were included in credit-bureau models, black and Latino credit scores presumably would be even lower.**
- **We find only weak support for the standard “demographics-don’t-matter” framework using SCF data.**
  - **Observable financial variables explain much but not all of age and racial/ethnic differences in DQ rates.**
  - **Even with a host of observable co-variates included, black families have higher DQ rates than predicted; old are lower.**



## *Preview of Conclusions and Implications (cont.)*

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- **We find strong support for the “peer-groups-matter” model.**
  - **Idiosyncratic portions alone of observable variables explain little of DQ-rate differences by age or race.**
  - **Peer-group means/norms are far more important.**
  - **Between-group differences dominate within-group differences.**
- **High DQ rates of young, less-educated and minority families may be the “tip of the iceberg” of living with greater background risk—some of it due to structural racism (and classism and age-related factors).**



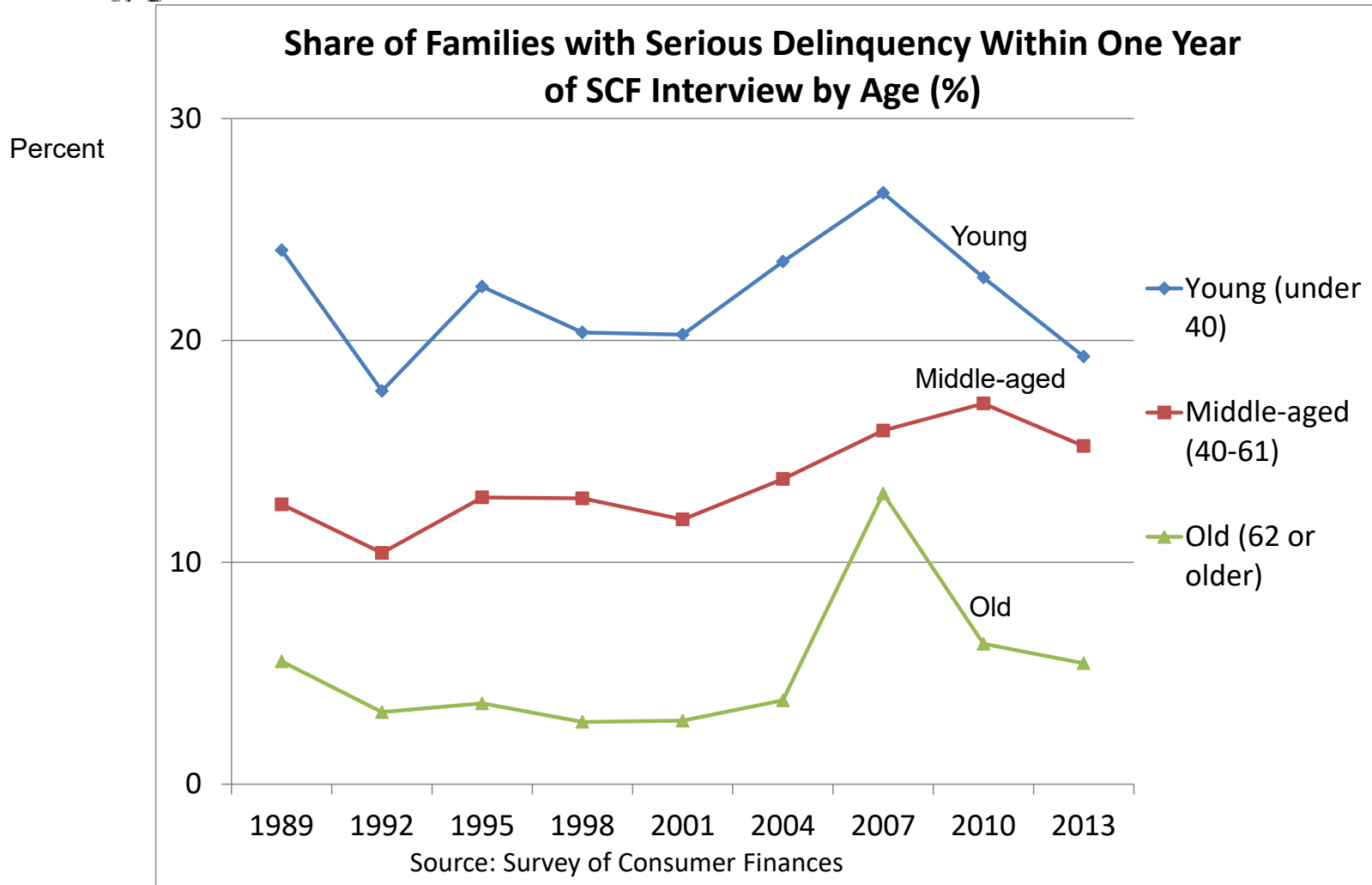
## *Background on Demographic Dimensions of Delinquency and Credit Scores*

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- **(Unconditional, i.e., with or without debt) serious-delinquency rates: Share of families with a 60+ delinquency in the year before SCF interview**
  - By age, education level, race or ethnicity
  - Source: Survey of Consumer Finances, 1989-2013
- **Credit scores: Frequency and cumulative distributions**
  - By age, race or ethnicity
  - Source: Federal Reserve Board (2007) enhanced credit-bureau dataset



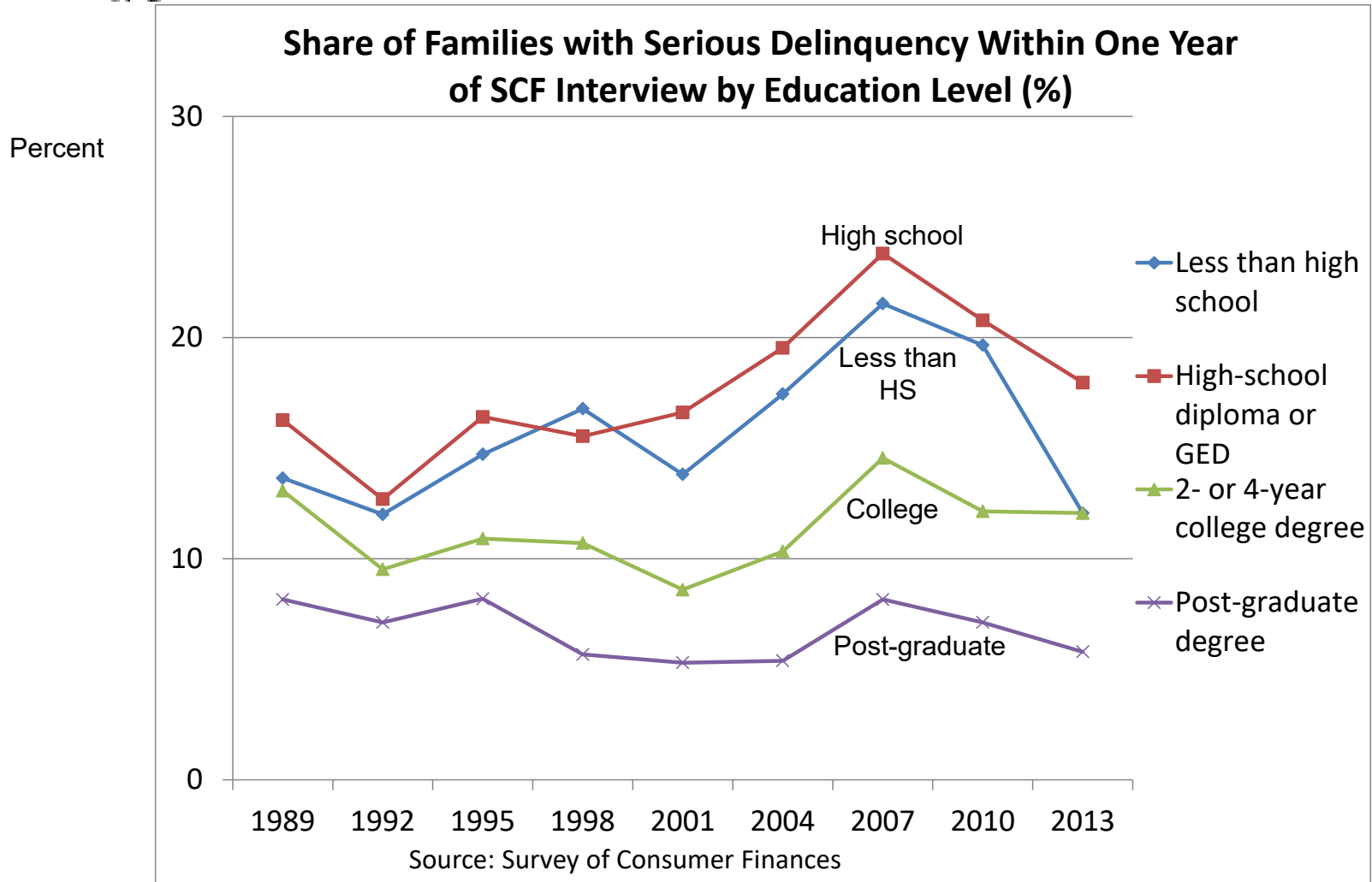
# Rate of Serious Delinquency (60+ Days) by Age of Family Head



Unconditional DQ rate: Number of families with serious DQ as share of all families in the group.



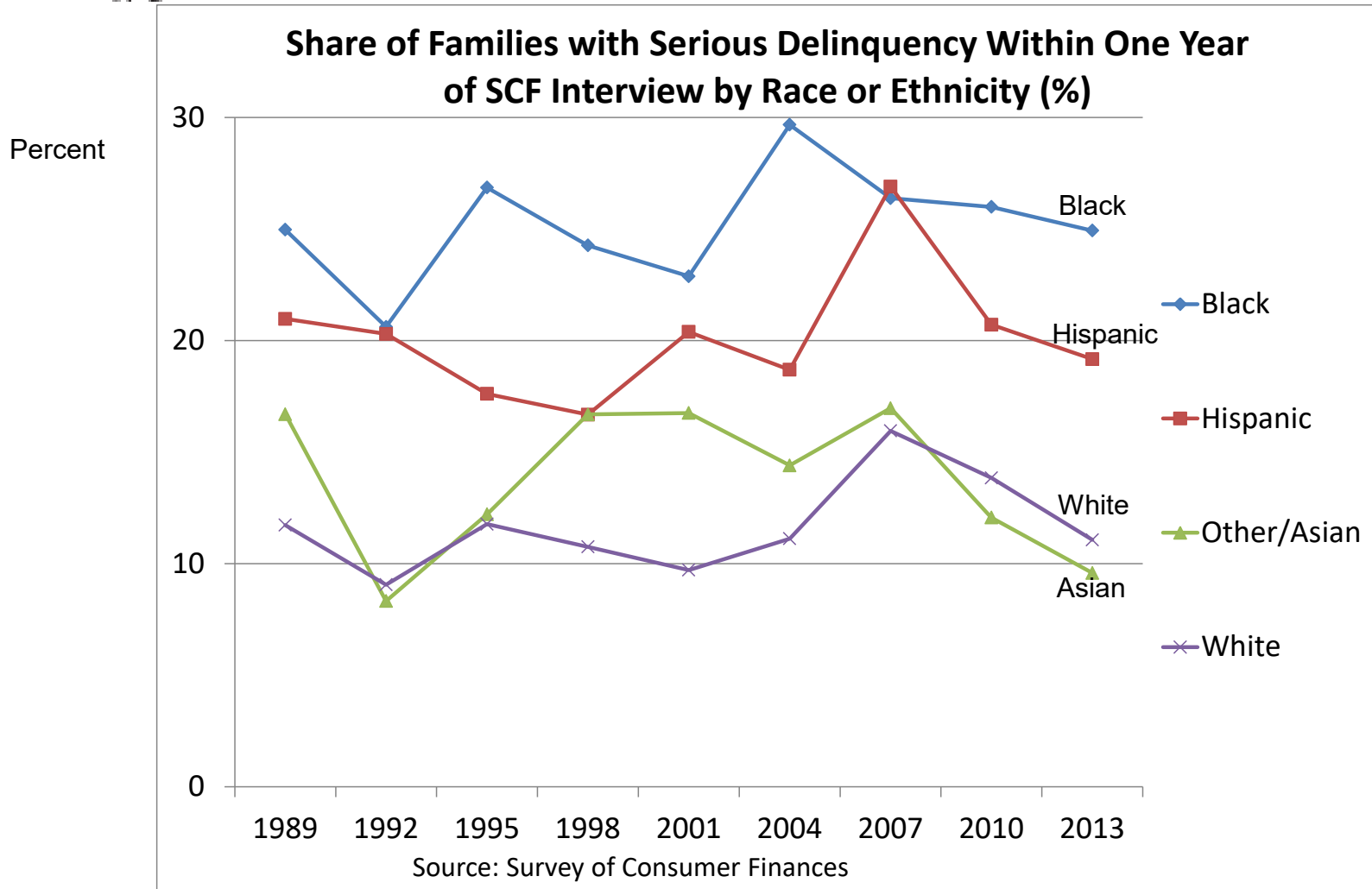
# Rate of Serious Delinquency (60+ Days) by Education of Family Head



Unconditional DQ rate: Number of families with serious DQ as share of all families in the group.



# *Rate of Serious Delinquency (60+ Days) by Race or Ethnicity*



Unconditional DQ rate: Number of families with serious DQ as share of all families in the group.



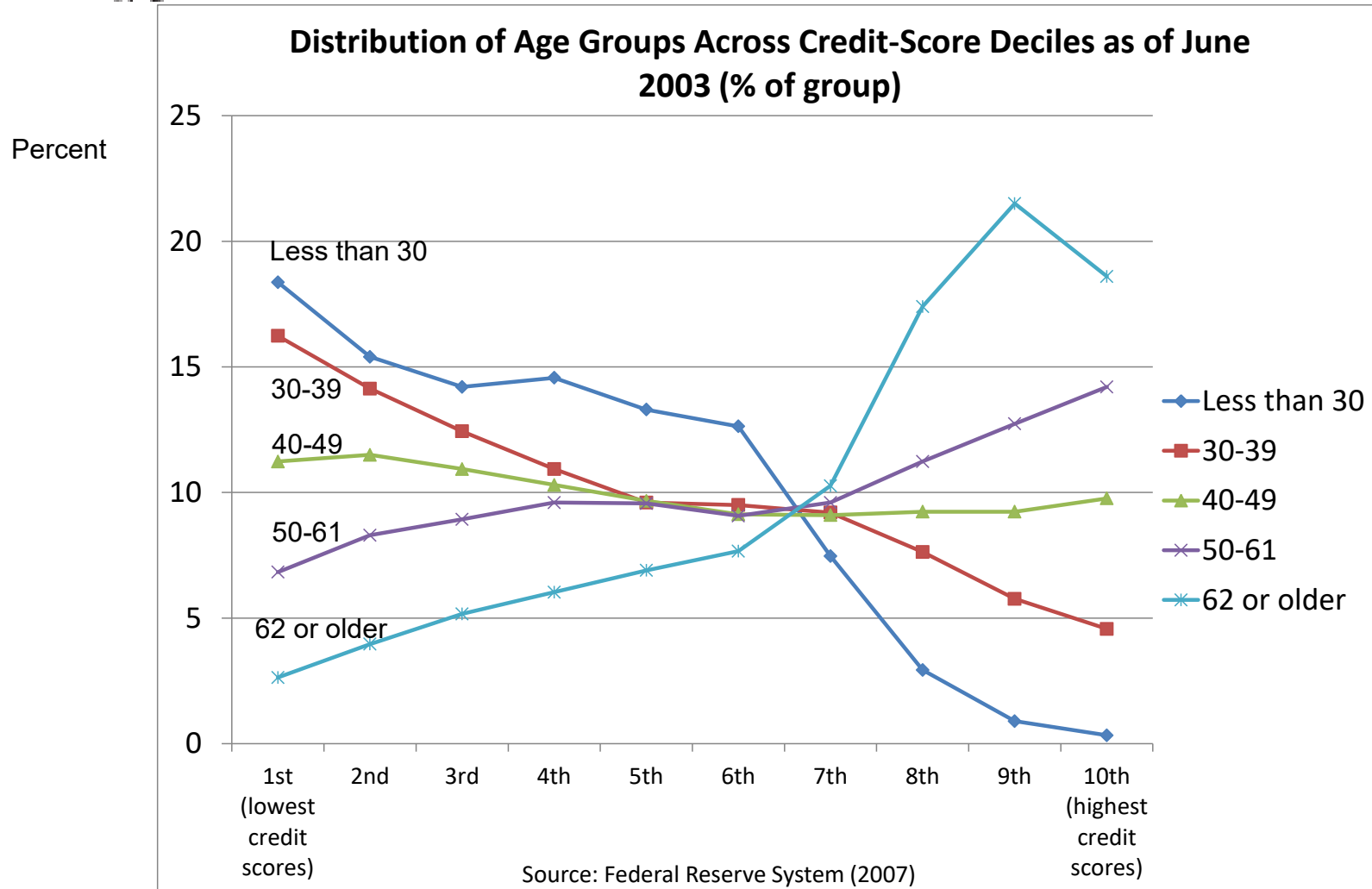


## *Race, Ethnicity and Credit Scores*

- In response to a Congressional mandate, the Federal Reserve Board built a credit-scoring model that included more information than the credit bureaus have—including, race and ethnicity.
- The Fed model used 2003-04 credit-bureau data plus race/ethnicity and other identifiers from the Social Security Administration; their conclusions:
  - Credit-scoring models predict age differences in DQ rates very well.
    - Also: Gender, marital status, urban/rural.
  - Differences in DQ rates by race and ethnicity are *not* predicted as well by commonly used credit-scoring models.
    - Other misses: Recent immigrants, census-tract income & minority percent.



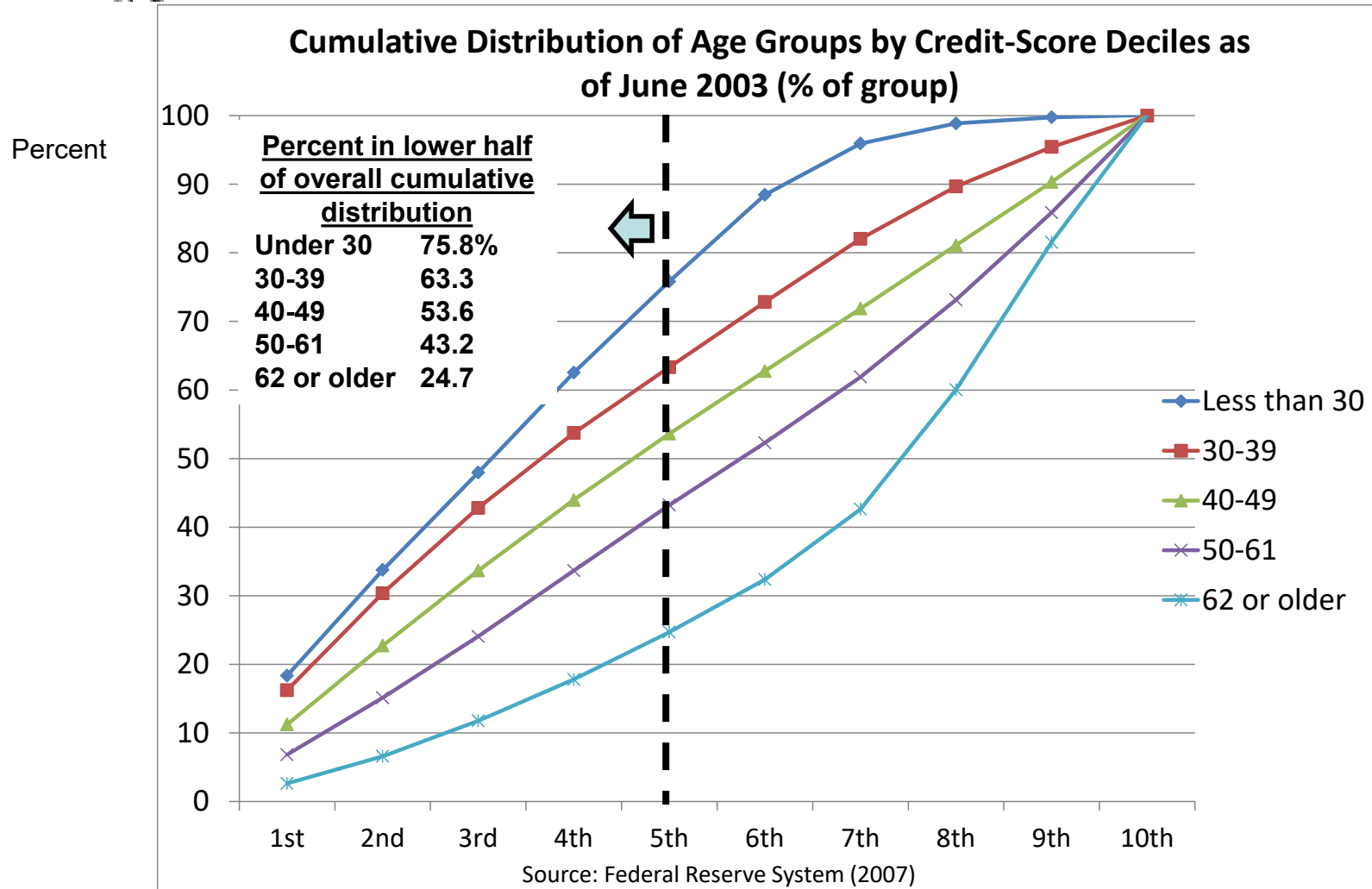
# *Fed Model: Credit-Score Frequency Distributions by Age*



Number of individuals with credit scores in each decile as share of all individuals in the group with scores.



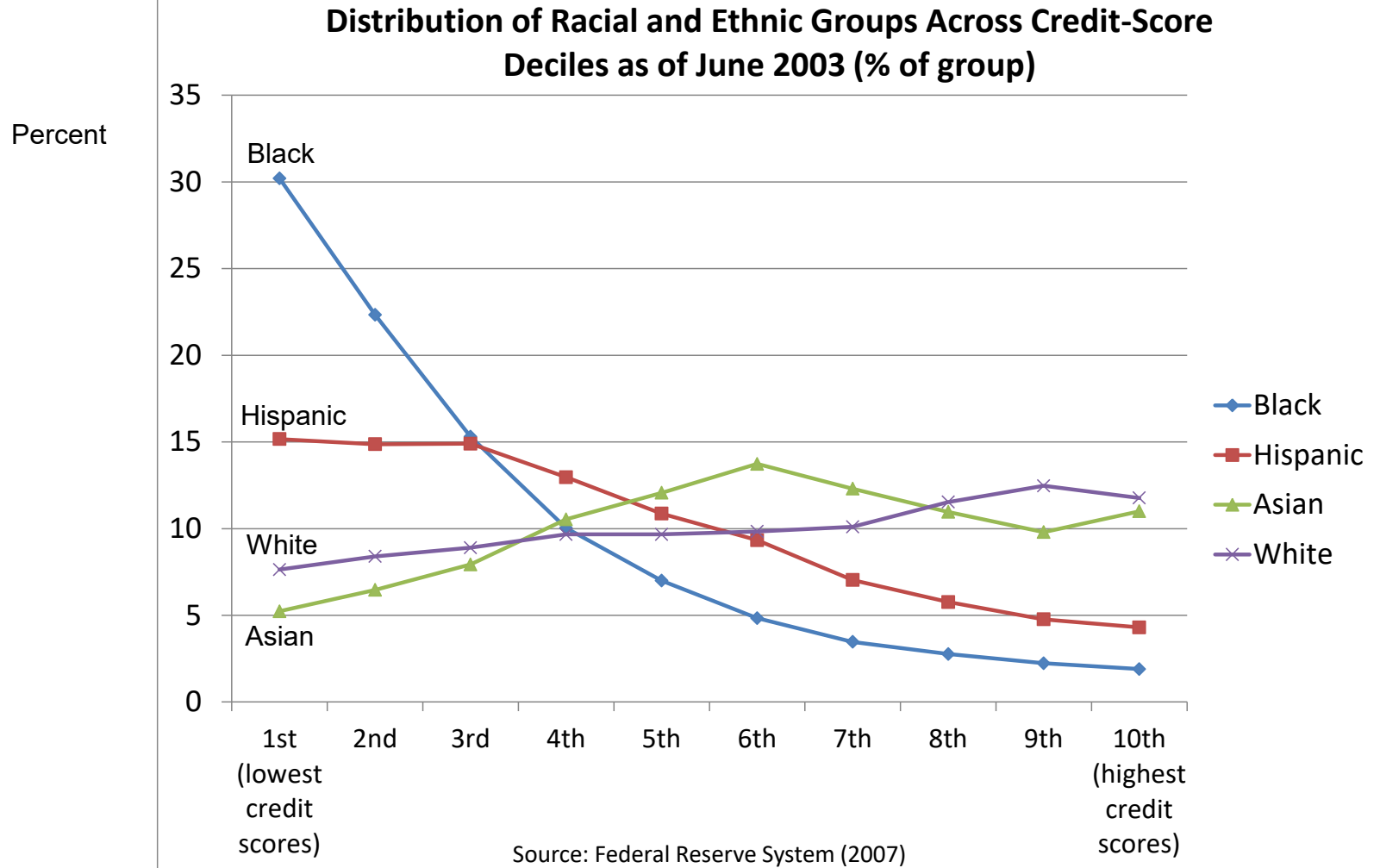
# *Fed Model: Credit-Score Cumulative Distributions by Age*



Number of individuals with credit scores in each decile or below as share of all individuals in the group with scores.



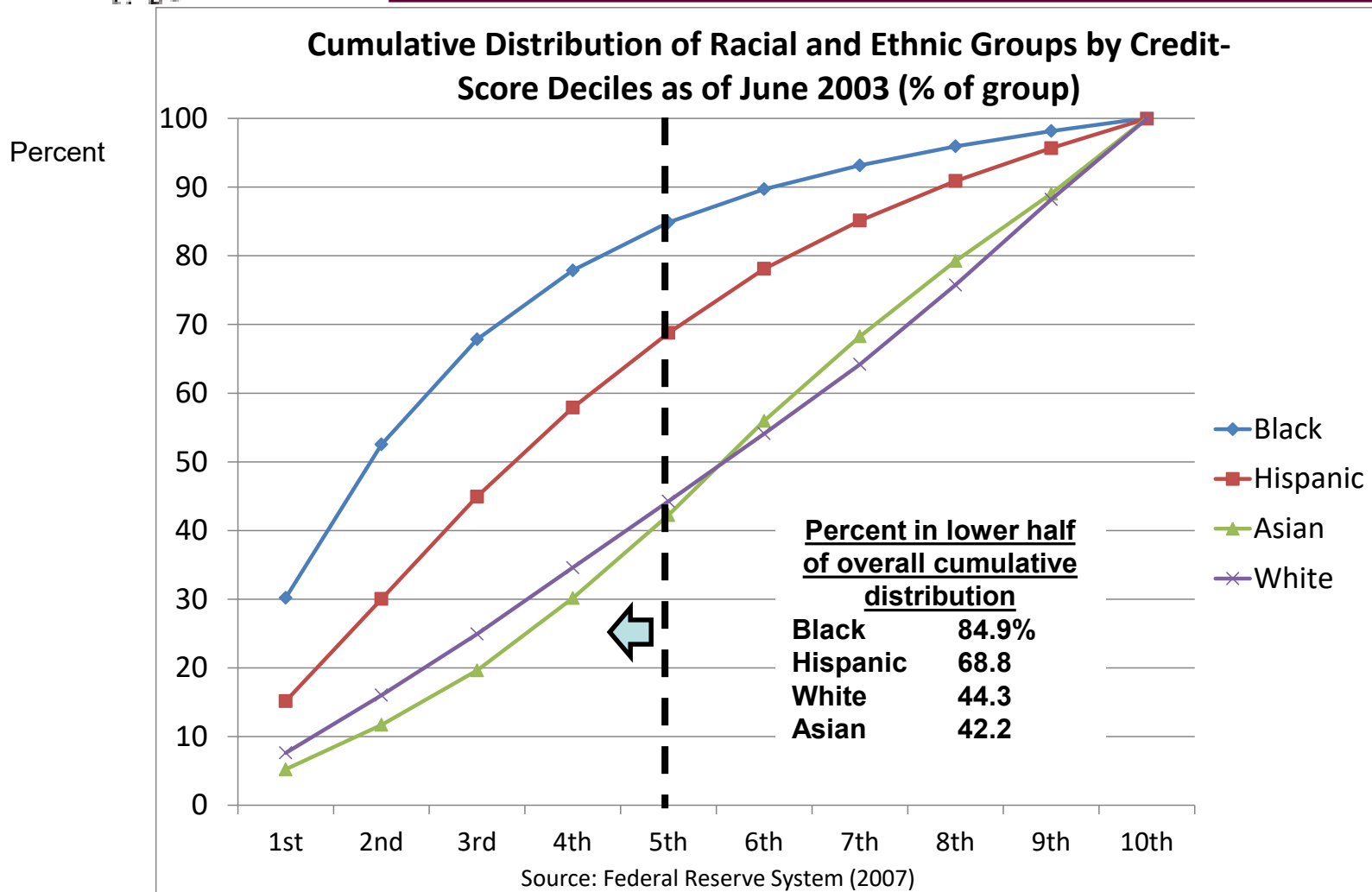
# *Fed Model: Credit-Score Frequency Distributions by Race or Ethnicity*



Number of individuals with credit scores in each decile as share of all individuals in the group with scores.



# Fed Model: Credit-Score Cumulative Distributions by Race or Ethnicity



*For more information on the Fed credit-scoring model, see the Appendix to these slides or our paper.*



## *Our Empirical Approach, Part I: Demographic Predictors of Delinquency*

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- **We estimate probit models for “any delinquency” and “serious delinquency” during the year before a family’s interview for the Federal Reserve Board’s Survey of Consumer Finances, 1989-2013.**
- **Estimation sample: 41,306.**
- **Unit of observation is the family.**
- **Baseline model I: Constant plus demographic indicator variables**
  - **Young (< 40 years old), middle-aged (40-61), old (62 or older).**
  - **High-school diploma or less, some college but not more than bachelor’s degree, post-graduate education.**
  - **Black, Hispanic, white, other/Asian.**



# *Age, Education and Race or Ethnicity Strongly Predict Delinquency*

	Dependent variable:	Any delinquency	Serious delinquency
Independent variables	Constant	-1.11*** (p = 0.00)	-1.66*** (p = 0.00)
Age	Young	0.23*** (0.00)	0.17*** (0.00)
<i>Omitted: Middle-aged</i>	Old	-0.54*** (0.00)	-0.57*** (0.00)
Education	High school	0.09*** (0.00)	0.10** (0.02)
<i>Omitted: College</i>	Post-grad	-0.34*** (0.00)	-0.42*** (0.00)
Race/ ethnicity	Black	0.39*** (0.00)	0.41*** (0.00)
<i>Omitted: White</i>	Hispanic	0.15*** (0.00)	0.16** (0.01)
	Other/Asian	0.03 (1.00)	0.01 (1.00)
Other variables: Survey yr, balance sheet, luck, family structure		Excluded	Excluded



## *Our Empirical Approach, Part II: A Demographics-Don't-Matter Model*

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- **Assume all families face the same opportunities, risks and choices: Demographics Don't Matter (DDM model).**
- **The only important differences between families are reflected in observable variables:**
  - **Financial choices (specifically: balance sheets)**
  - **Luck (income shocks, inheritances, health status)**
  - **Family structure (marital status, # of children, providing financial support to extended family)**
- **Model II: Delinquency is a random shock mediated by the (observable) choices you made.**





## *Implications of A Demographics- Don't-Matter Model*

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- Families that choose to “live closer to the financial edge” are more likely to encounter “tipping points” into delinquency.
- To lower a family’s default risk: You should (and can) mimic the financial, educational, etc. behavior of families with *ex-post* low delinquency rates—namely, whites.
- This is a “post-racial” framing of the problem and is the mainstream approach in economics.



# *DDM Model: Observable Variables (Especially Balance Sheet) Largely Explain DQ Rates; Demographic Factors Unimportant*

	Dependent variable:	Any delinquency	Serious delinquency
Independent variables	Constant	-1.59*** (p = 0.00)	-1.98*** (p = 0.00)
Age	Young	0.06 (1.00)	0.01 (1.00)
<i>Omitted: Middle-aged</i>	Old	-0.23*** (0.00)	-0.25 (0.68)
Education	High school	0.02 (1.00)	0.01 (1.00)
<i>Omitted: College</i>	Post-grad	-0.11 (1.00)	-0.09 (1.00)
Race/ ethnicity	Black	0.26*** (0.00)	0.23* (0.06)
<i>Omitted: White</i>	Hispanic	0.07 (1.00)	0.05 (1.00)
	Other/Asian	-0.02 (1.00)	-0.09 (1.00)
Other variables: Survey yr, balance sheet, luck, family structure		Included	Included



## *Our Empirical Approach, Part III: A Peer-Groups-Matter Model*

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- Assume all families do not face the same opportunities, risks and choices: Peer Groups Matter (PGM model).
- Differences between families in observable (right-hand side) variables should be parsed into peer-group effects and idiosyncratic choices:
  - Financial choices (specifically: balance sheets)
  - Luck (income shocks, inheritances, health status)
  - Family structure (marital status, # of children, providing financial support to extended family)



## *Our Empirical Approach, Part III: A Peer-Groups-Matter Model*

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- **Our implementation:** Express these variables in de-meaned form, defining peer groups by age and race or ethnicity.
- **The maintained assumption:** Delinquency results from random shocks mediated by observable choices...
- ... but also recognize that some families bear more risk due to peer-group norms (“starting points”).
- **To lower default risk:** Change peer-group norms and realities(!), not just individual choices and behaviors.



# *PGM Model: Idiosyncratic Parts of Observable Variables Explain Little; Demographics Matter!*

	Dependent variable:	Any delinquency	Serious delinquency
<b>Independent variables</b>	<b>Constant</b>	<b>-1.08***</b> (0.00)	<b>-1.91***</b> (0.00)
<b>Age</b>	<b>Young</b>	<b>0.23***</b> (0.00)	<b>0.20**</b> (0.01)
<i>Omitted: Middle-aged</i>	<b>Old</b>	<b>-0.60***</b> (0.00)	<b>-0.68***</b> (0.00)
<b>Education</b>	<b>High school</b>	<b>0.06</b> (1.00)	<b>0.10</b> (1.00)
<i>Omitted: College</i>	<b>Post-grad</b>	<b>-0.12</b> (0.99)	<b>-0.10</b> (1.00)
<b>Race/ethnicity</b>	<b>Black</b>	<b>0.37***</b> (0.00)	<b>0.41***</b> (0.00)
<i>Omitted: White</i>	<b>Hispanic</b>	<b>0.14</b> (0.96)	<b>0.18</b> (0.97)
	<b>Other/Asian</b>	<b>-0.01</b> (1.00)	<b>-0.08</b> (1.00)
<b>Survey year; <u>idiosyncratic parts</u> of bal. sheet, luck, family structure</b>		<b>Included</b>	<b>Included</b>

*Why is Hispanic result different? Greater diversity of experiences within group?*  
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## *In Sum: The Demographics of Delinquency*

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- If demographics don't matter, families with *ex-post* delinquency-prone characteristics simply must have chosen to take more risk.
- The standard DDM approach suggests people choose to live closer to “tipping points” into delinquency; “fix it” by mimicking low-risk groups.
- If peer-group norms and realities matter a lot, then some families live with more risk; idiosyncratic choices may matter relatively little.
- A PGM approach suggests that high DQ rates of young, less-educated and minority families may be the “tip of the iceberg” of greater background risk.



## *Appendix: Federal Reserve Board Credit-Scoring Model*

- **Federal Reserve Board, “Report to the Congress on Credit Scoring and Its Effects on the Availability and Affordability of Credit,” August 2007.**
  - Submitted to Congress pursuant to section 215 of the Fair and Accurate Credit Transactions (FACT) Act of 2003.
- **Board staff combined 2003-04 credit-bureau data (from TransUnion) and two generic credit scores for each individual with Social Security and Census demographic data.**
- **Estimation sample: 200,437 individuals.**
- **Performance period: June 2003 to December 2004.**
- **Analyzed predictive ability of three generic credit-scoring models:**
  - TransRisk Score (publicly available)
  - VantageScore (publicly available)
  - Federal Reserve Board Base Score (created for this report)



## *Appendix: Key Results of Federal Reserve Board Credit-Scoring Study*

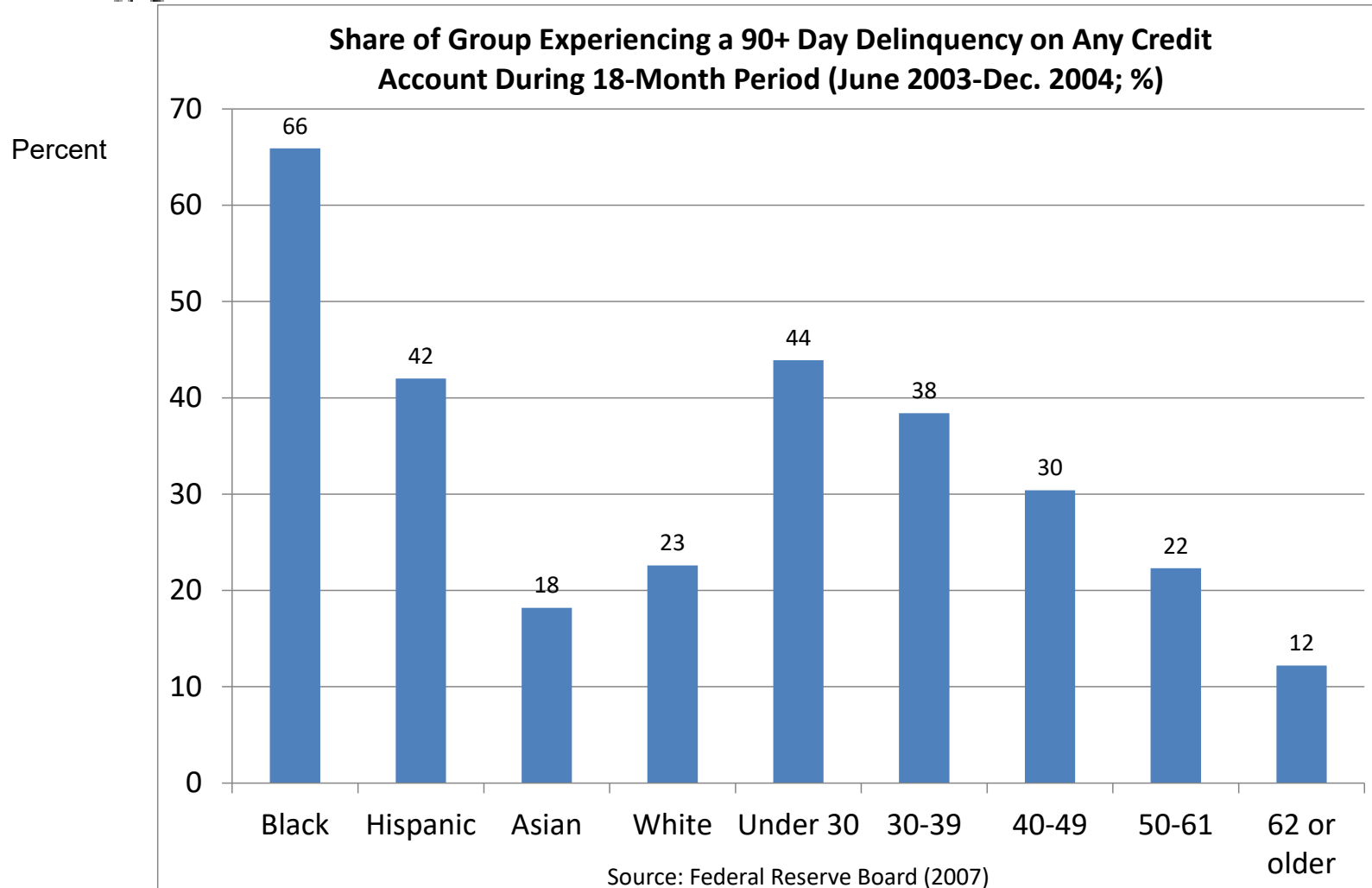
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- **Credit-scoring models predict age differences in DQ rates very well.**
  - Length of credit history proxies for age; birth year usually known, too.
  - Models also predict well the differences in DQ rates by gender, marital status and urban/rural residency.
- **Credit-scoring models do not predict differential DQ rates by race or ethnicity as well.**
  - The Equal Credit Opportunities Act (ECOA) and the Fair Housing Act (FHA) prohibit the use of these characteristics in lending:
    - ECOA: Race, color, religion, sex, national origin, age and marital status.
    - FHA: First five above plus handicap and family status.
  - Allowed observable variables do not capture all of the information in race or ethnicity.
  - Other groups that credit-scoring models predict less well:
    - Recent immigrants (they look young due to short credit histories).
    - DQ rates by census-tract income & census-tract minority-population shares.





## *Appendix: Serious-Delinquency Rate During June 2003-December 2004*





## *Appendix: Serious-DQ Prediction Errors: Small by Age, Large by Race or Ethnicity*

