HOUSEHOLD CREDIT AND EMPLOYMENT IN THE GREAT RECESSION

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QUESTION

How much did the contraction in the supply of credit to households contribute to the decline in employment during the Great Recession?

ACCOUNTING FOR THE GREAT RECESSION

- Collapse in house prices: destroyed net worth and collateral, which reduced demand
  - Mian and Sufi (2014), Mian, Rao, and Sufi (2013)
- Firm credit: financial crisis led to a contraction in credit to firms, which reduced investment and labor demand
  - Almeida, Campello, Laranjeira, and Weisbenner (2009), Campello, Graham, and Harvey (2010), Chodorow-Reich (2014), Cornett, McNutt, Strahan, and Tehranian (2011), Greenstone, Mas, and Nguyen (2014), and Ivashina and Scharfstein (2010)
- Household credit: financial crisis led to a contraction in credit to households, which reduced demand
  - Theory: Eggertson and Krugman (2012), Guerreri and Lorenzoni (2011), Hue and Rios-Rull (2013), Midrigan and Philippon (2011)
  - Empirics: Benmelech, Meisenzahl, and Ramcharan (2014), Dagher and Kazimov (2012), Gropp, Krainer, and Laderman (2014), Ramcharan, Van den Heuvel, and Verani (2012)
  - Closely related to DiMaggio and Kermani (2014), who focus on the credit boom

TODAY

- Exploit collapse of Wachovia as exogenous shock to credit supply across counties

  -large, average retail lender, became distressed due to purchase of toxic lender Golden West Financial in 2006

- Exposure to Wachovia affected local outcomes

  -flow of credit, retail expenditures, house prices, and house sales fell

  -employment losses concentrated in residential construction and non-tradables

- Show that Wachovia primarily reflects shock to household credit

  -elasticity of employment with respect to supply-driven changes in measure of household credit is large, about 0.3

- Construct a measure of the shock to household credit in a county and do a simple accounting exercise

  -identify lender-specific shocks and weight them in each county

  -direct effect of shocks to household credit imply large losses in employment: 30-60% of what was observed

WACHOVIA AND THE "DEAL FROM HELL"

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Kennedy Thompson (CEO of Wachovia): *I think we're going to be happy that we did this deal long term. […] because of the experience that we're having in the West as we use the branches that we acquired and I think on the mortgage side this product is. . . this Pick-a-Pay product is going to be very attractive when yield curves go back to normal and as the housing comes out of the recovery. So yes we're going through a little pain with it now but I think a year out, 18 months out, two years out we are going to be very happy that we did this deal.*

-Transcript of Wachovia's 2007 second quarter earnings call

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Herbert Sandler: *My wife and I had a company which aggressively marketed subprime mortgages and then bundled them into securities to sell to banks such as Wachovia. Today our portfolio is worth almost nothing, though, at one point it was worth close to $19 billion.*

Pelosi: *My god, I am so sorry! Were you able to sell it for anything?*

H. Sandler: *Yes! For $24 billion!*

Pelosi: *I see. So, in that sense . . . you're not here to speak as actual victims?*

H. Sandler: [he chuckles] *No, no no! That would be Wachovia Bank!*

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VALIDITY OF THE SHOCK

- Wachovia contracted household access to credit

- Local exposure to Wachovia matters

- Exposure to Wachovia is not correlated with other shocks

DATA

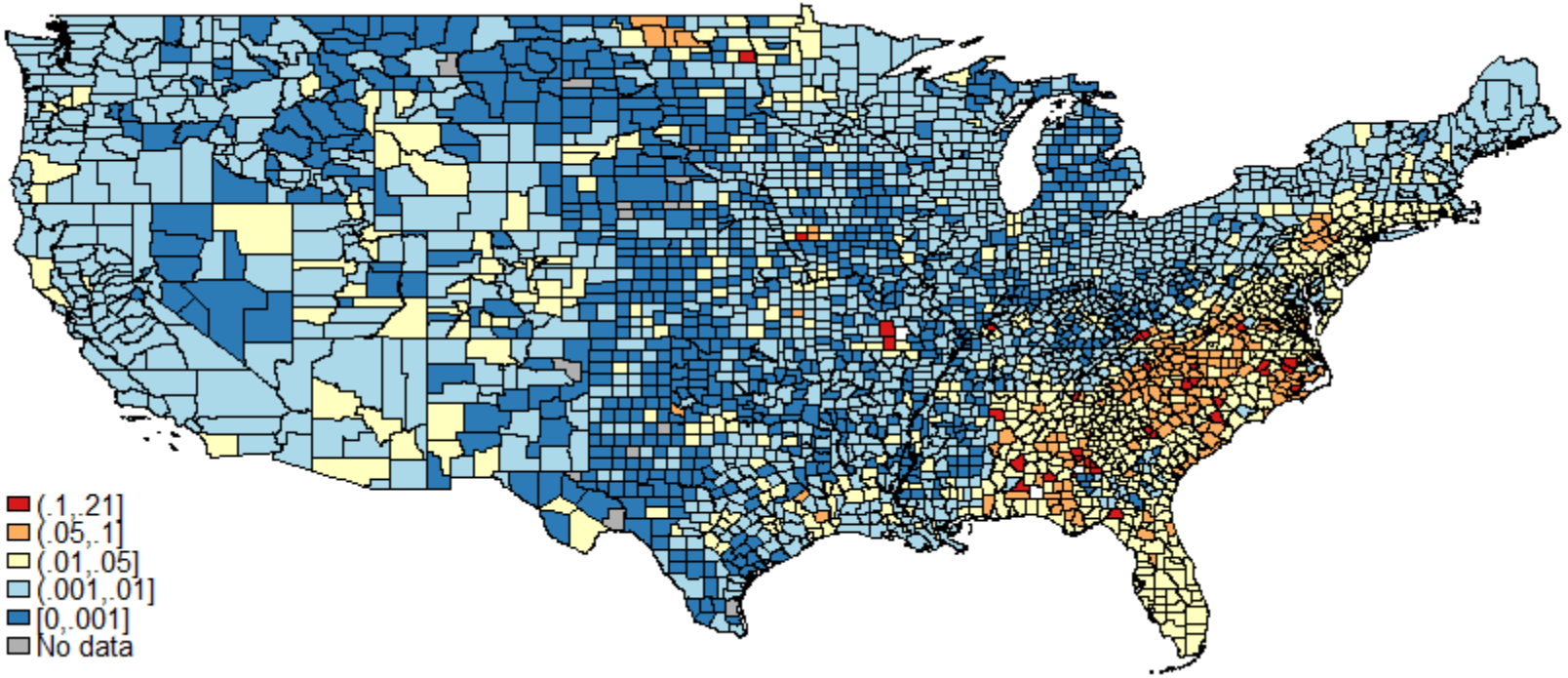
- Household credit: annual flows from the Home Mortgage Disclosure Act (HMDA)
  - Application level: income, race, purpose of loan, result
  - Geographic location to the census tract and a lender ID
  - Comprehensive: Estimated to cover at least 90% of all mortgage originations by Dell'Arriccia, Igan, and Laeven (2012)

- Firm Credit: annual flow of small business loans from the Community Reinvestment Act (CRA)
  - County level: loans of less than $1 million dollars to a business
  - Geographic location to county and a lender ID
  - Estimated to cover about 30% of total originations by Greenstone, Mas, and Nguyen (2014)

- Employment and payroll from County Business Patterns
  - Classify 4-digit NAICS into tradable, non-tradable, and construction using Mian and Sufi (2014)

- House prices and sales from Zillow, debt stocks from the New York Federal Reserve –Equifax Consumer Credit Panel (CCP), income from the IRS, and non-durable expenditures from the Nielsen retail scanner data.

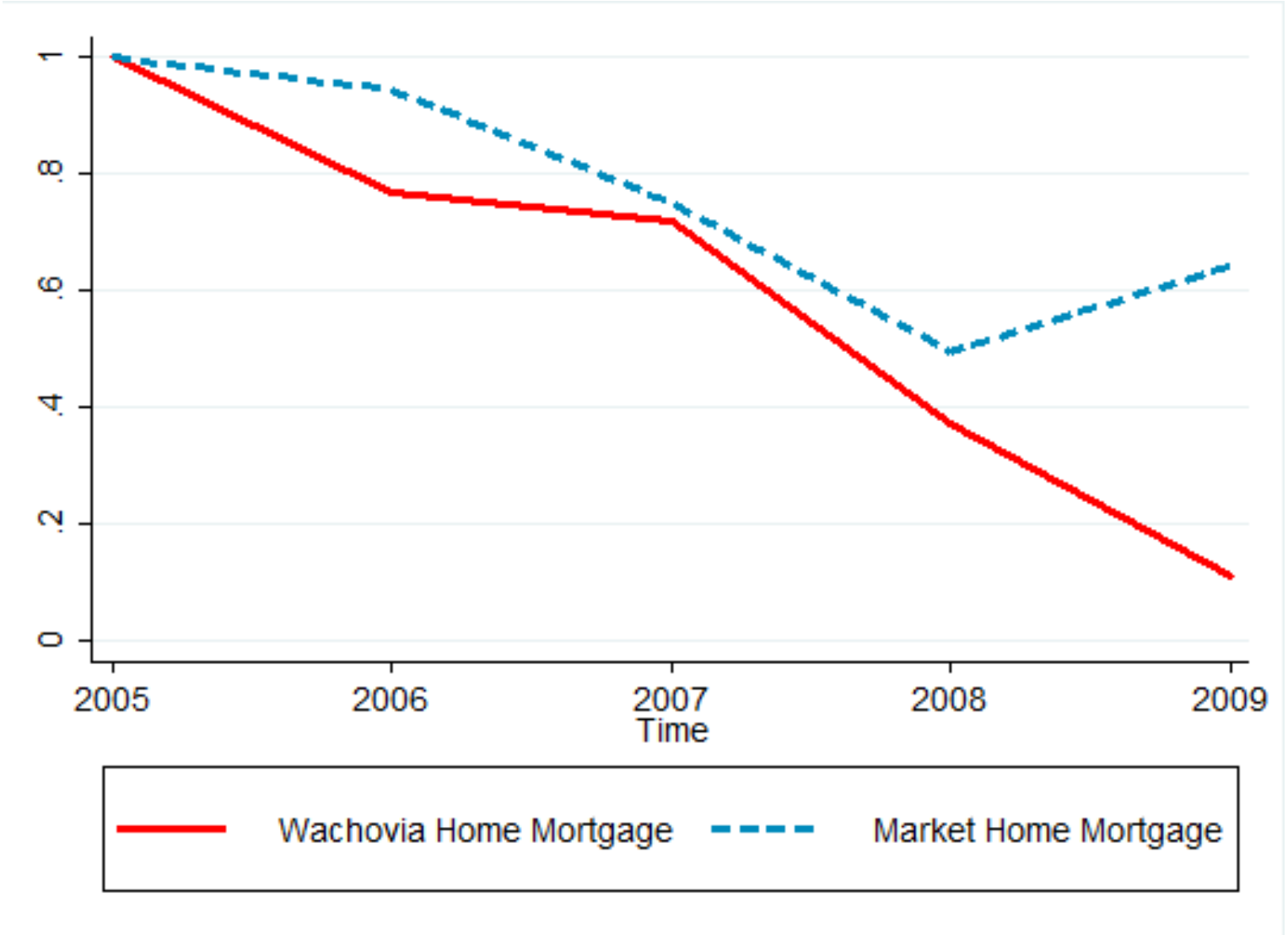
WACHOVIA'S HOUSEHOLD CREDIT MARKET SHARE 2005-2006



Wachovia heavily concentrated in the East and South

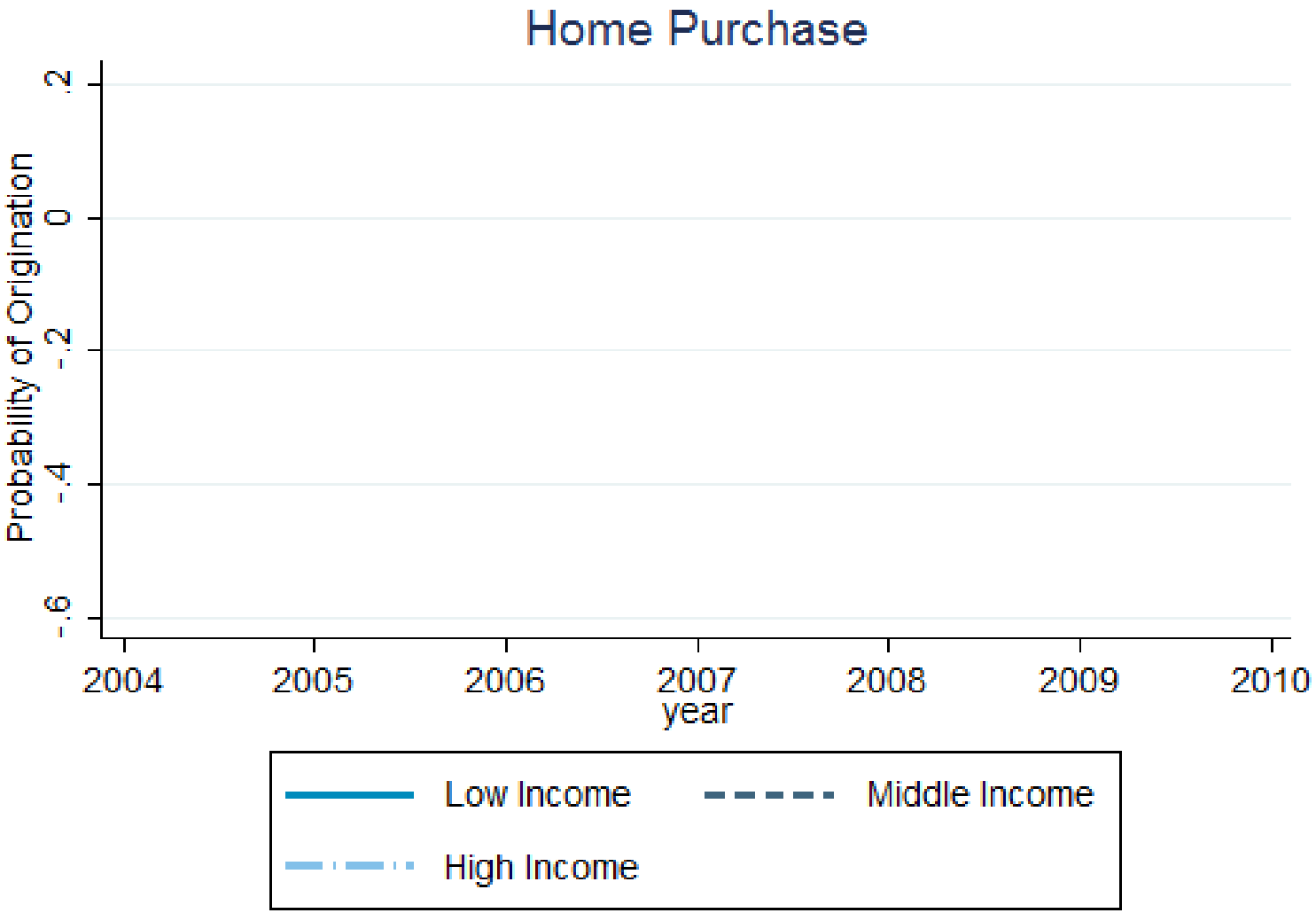
-Average share in these areas around 2%

DID WACHOVIA REDUCE ACCESS TO CREDIT?



DID WACHOVIA REDUCE ACCESS TO CREDIT?

$$Prob(\text{Originated})_{it} = \alpha_{ct} + \beta_t \text{ Wachovia}_i + X_i' \gamma_t + e_{it}$$



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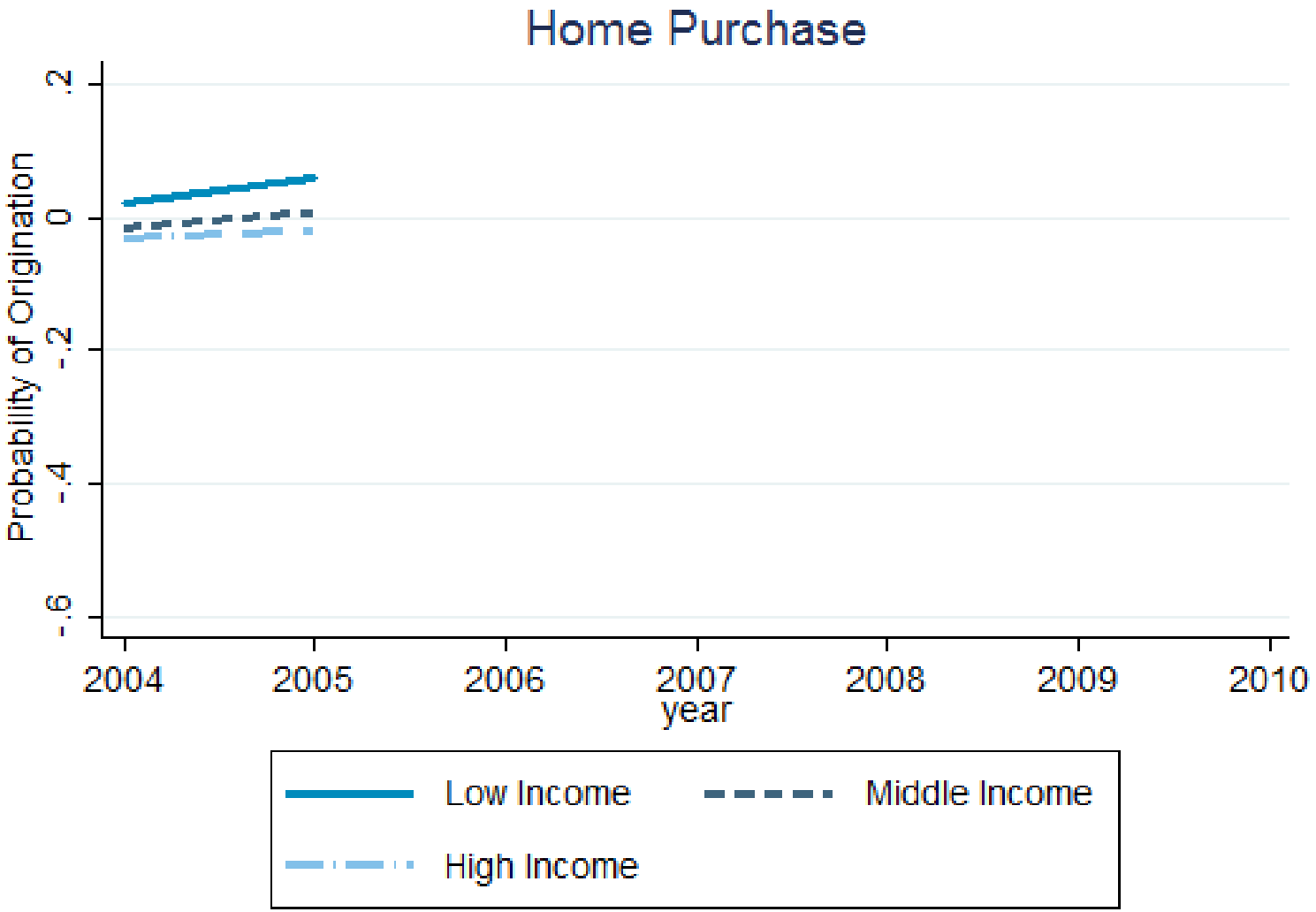

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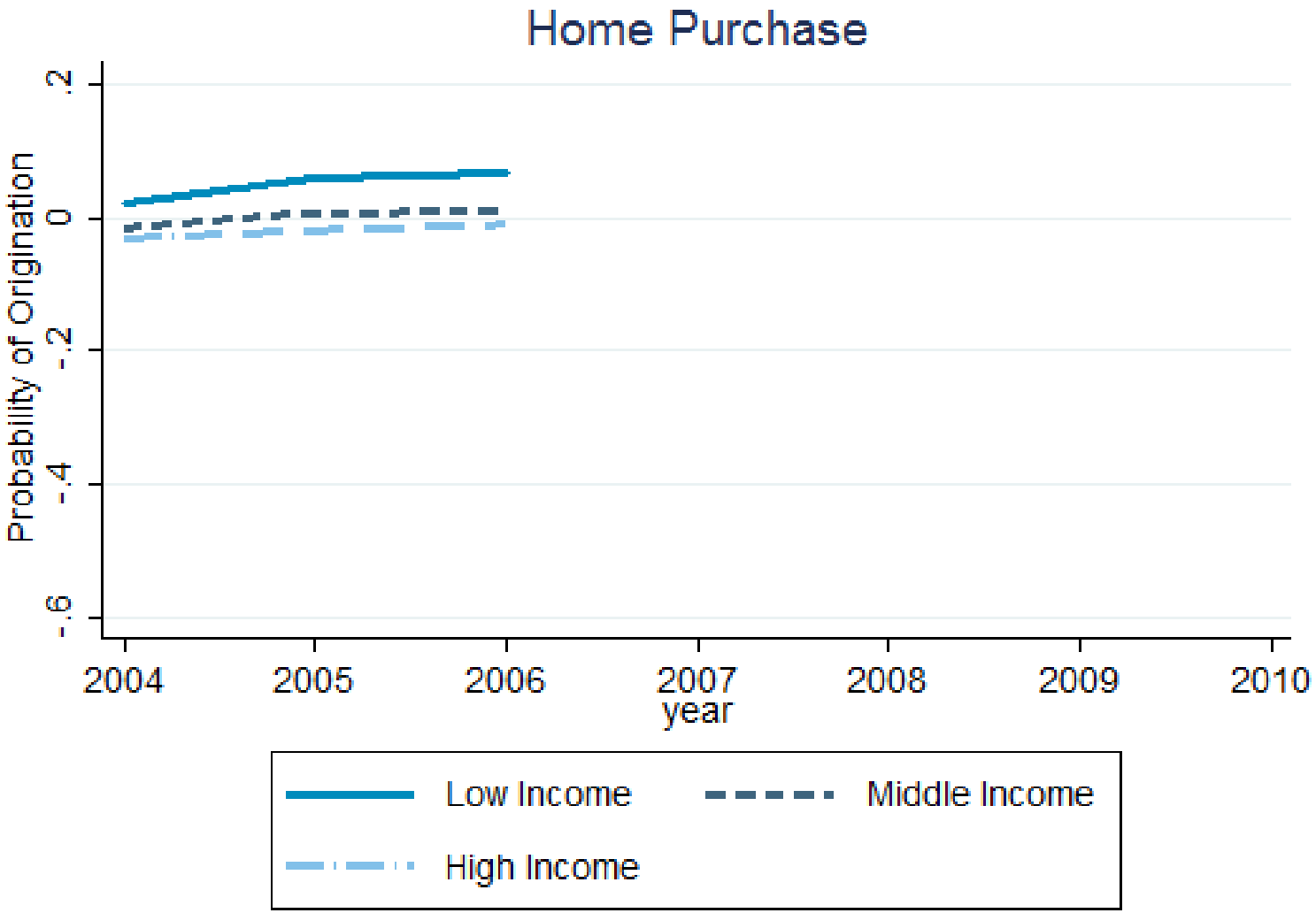

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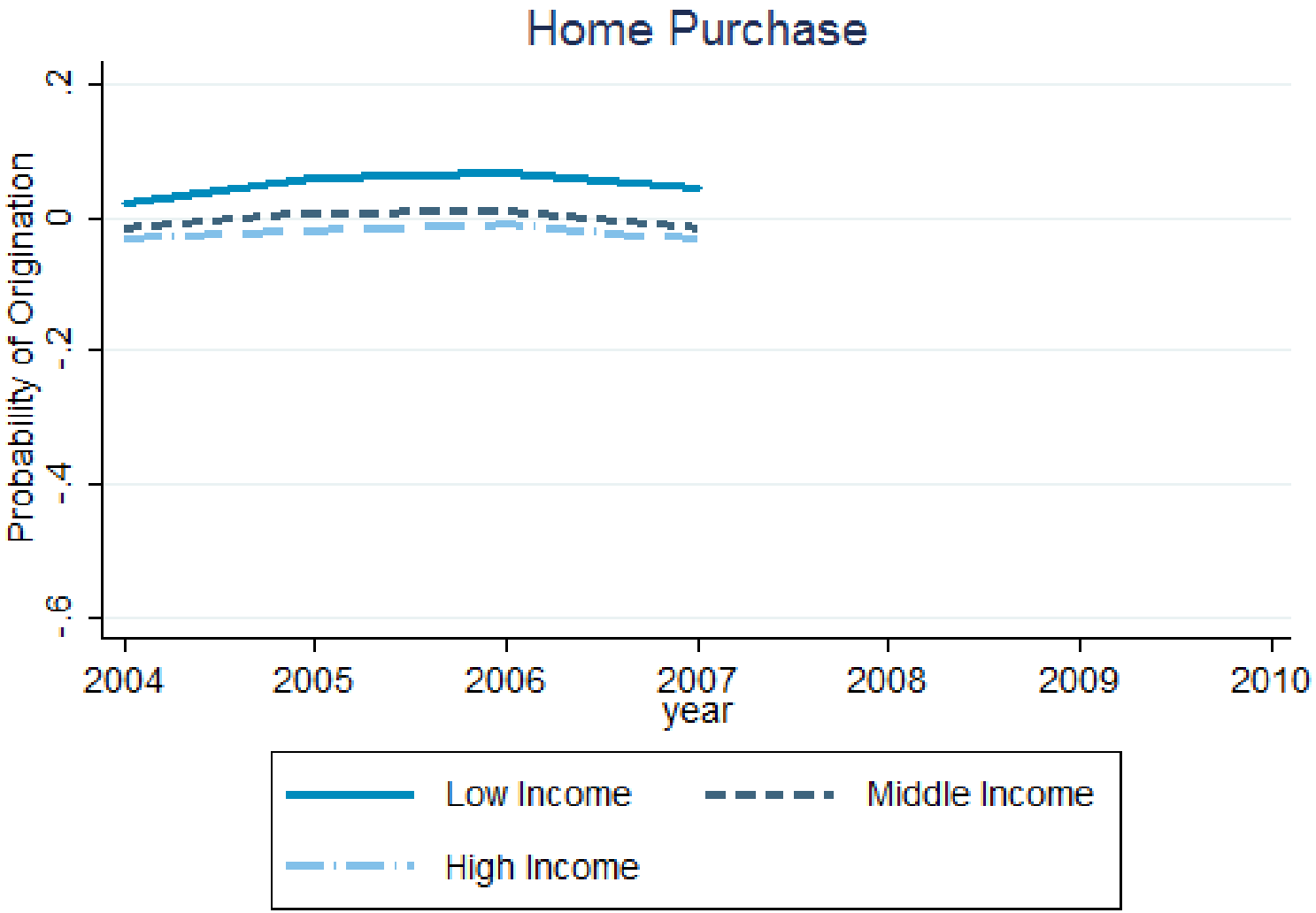

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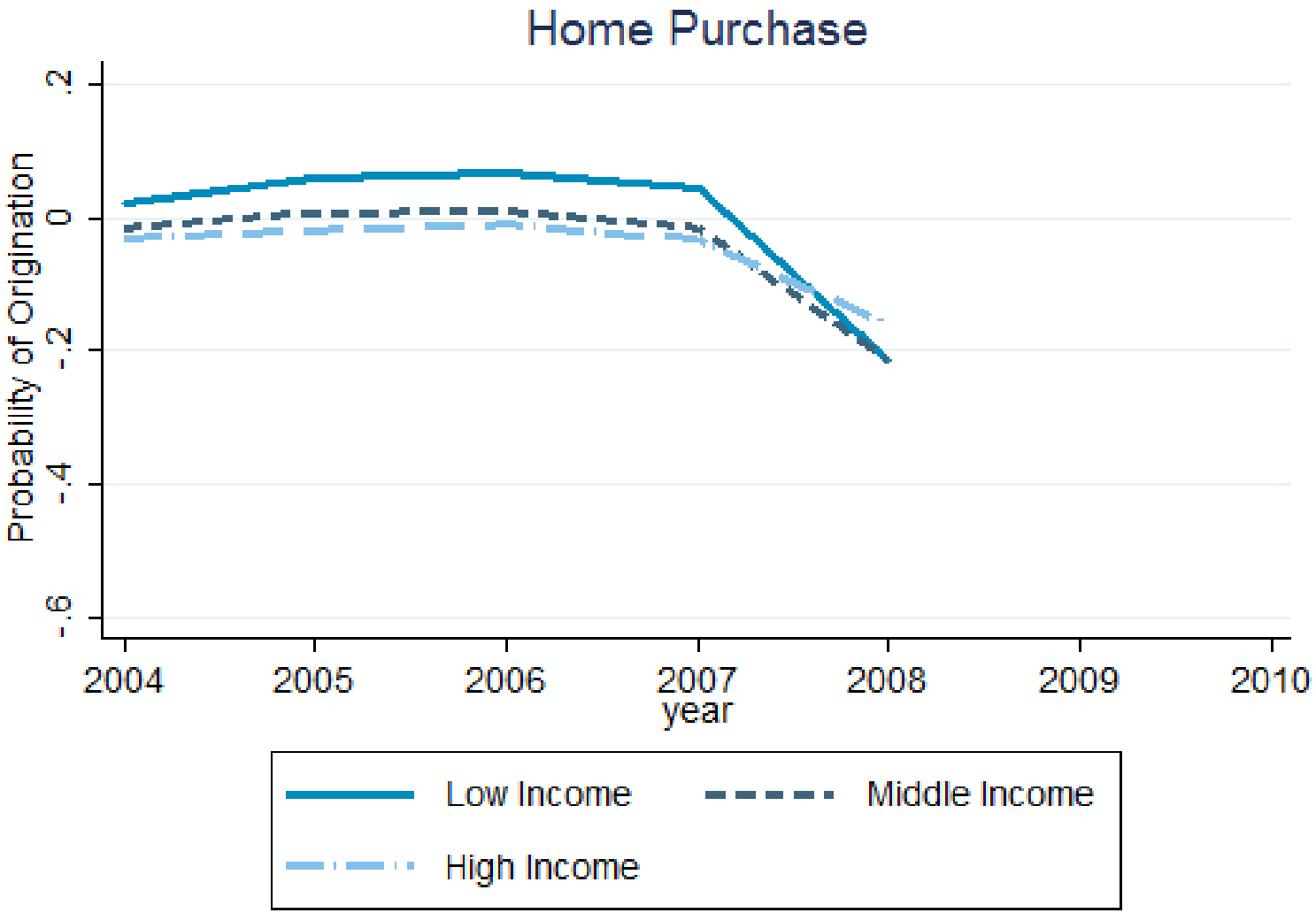

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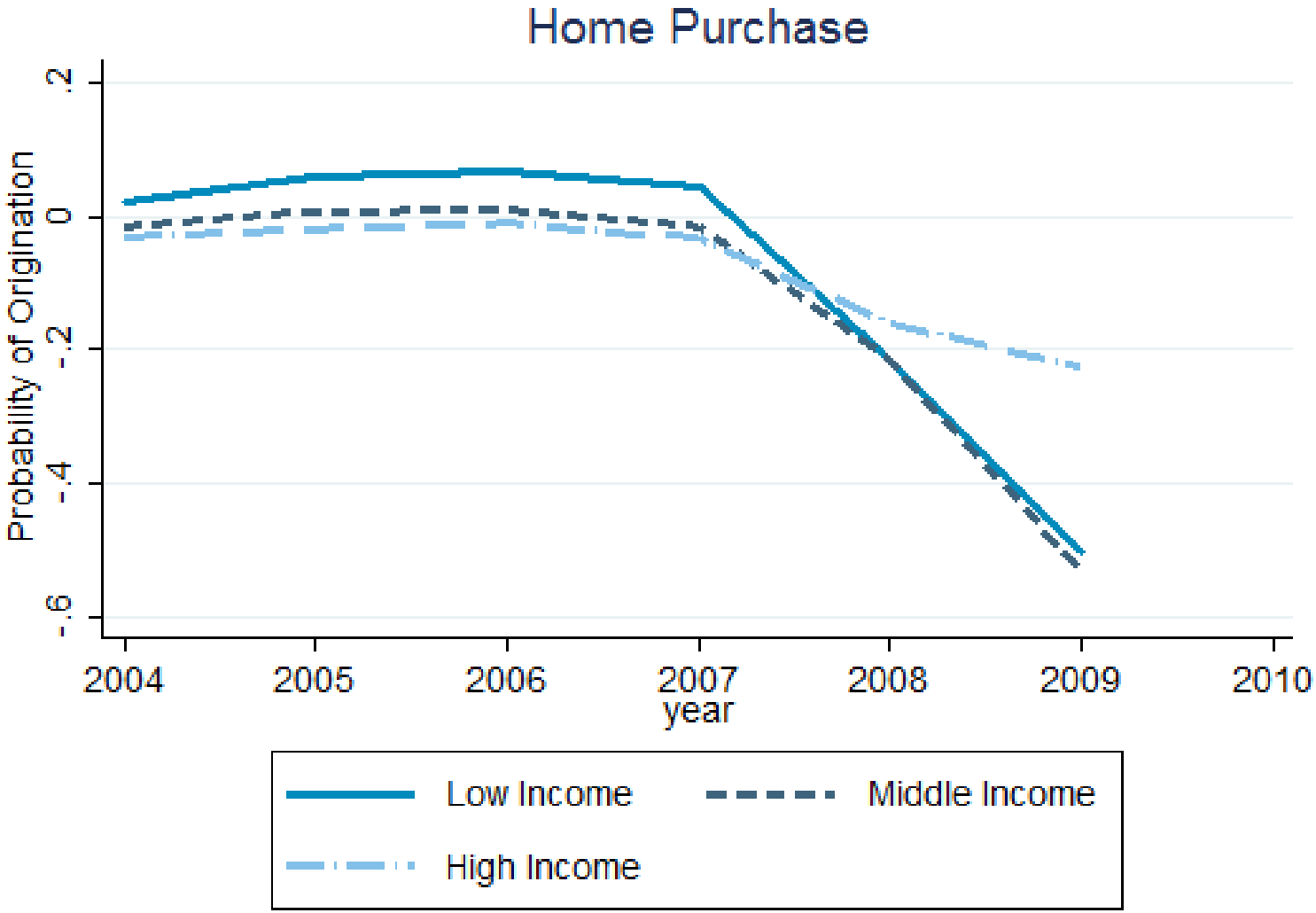

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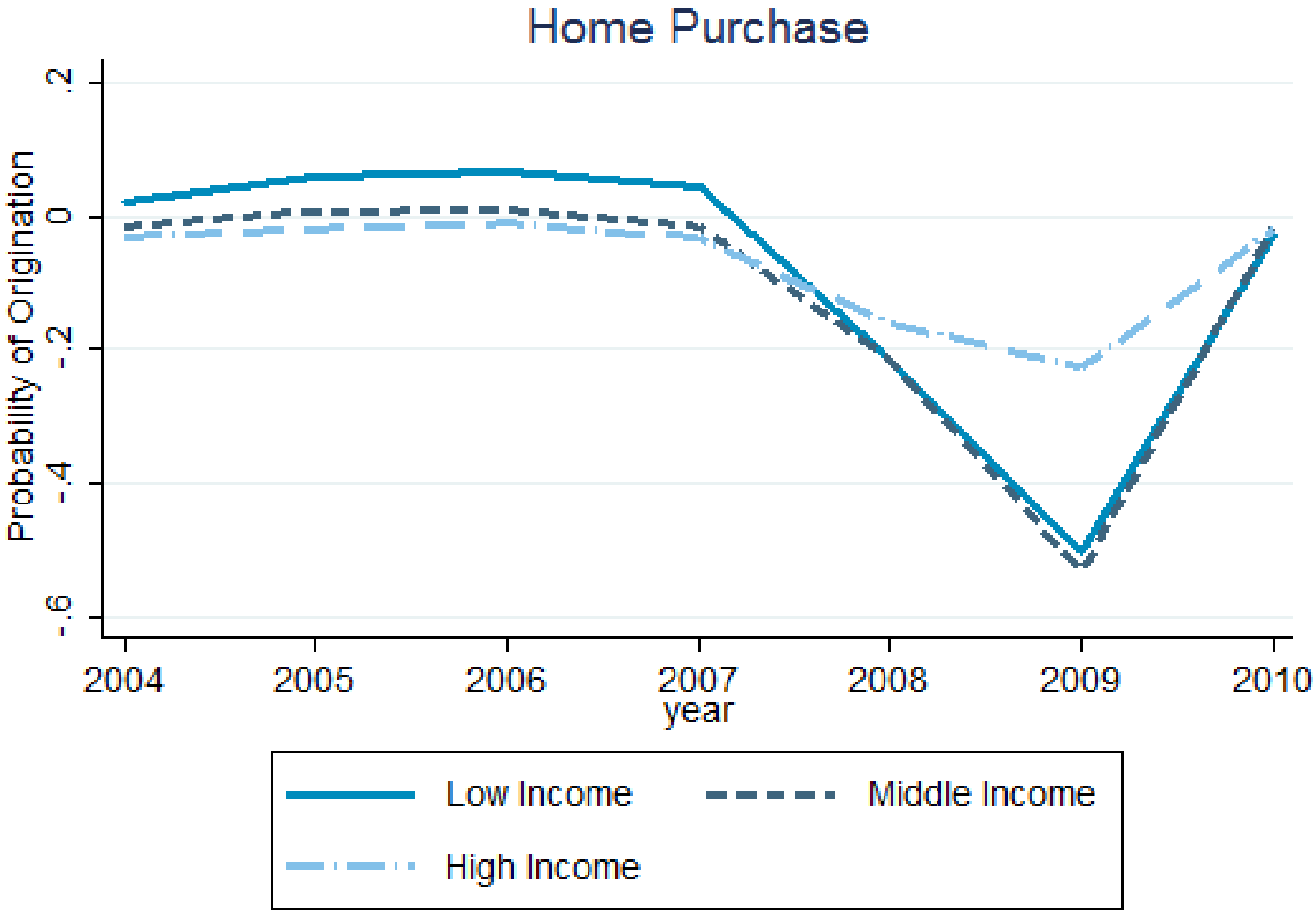

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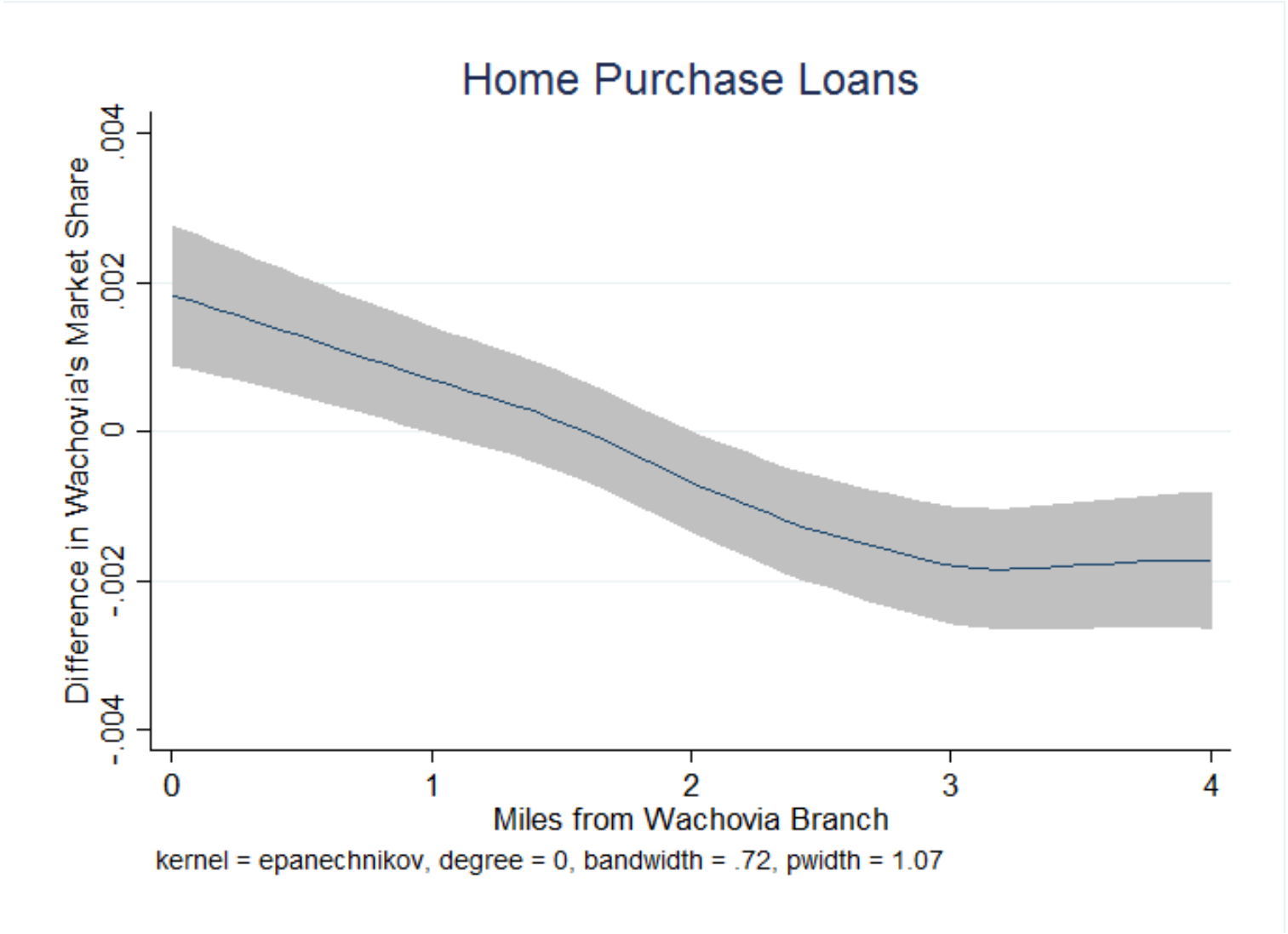
DISTANCE TO WACHOVIA AND MARKET SHARE

$$(\text{WACHOVIA MARKET SHARE} - \text{MEAN})_i = f(\text{DISTANCE TO BRANCH}_i) + e_i$$



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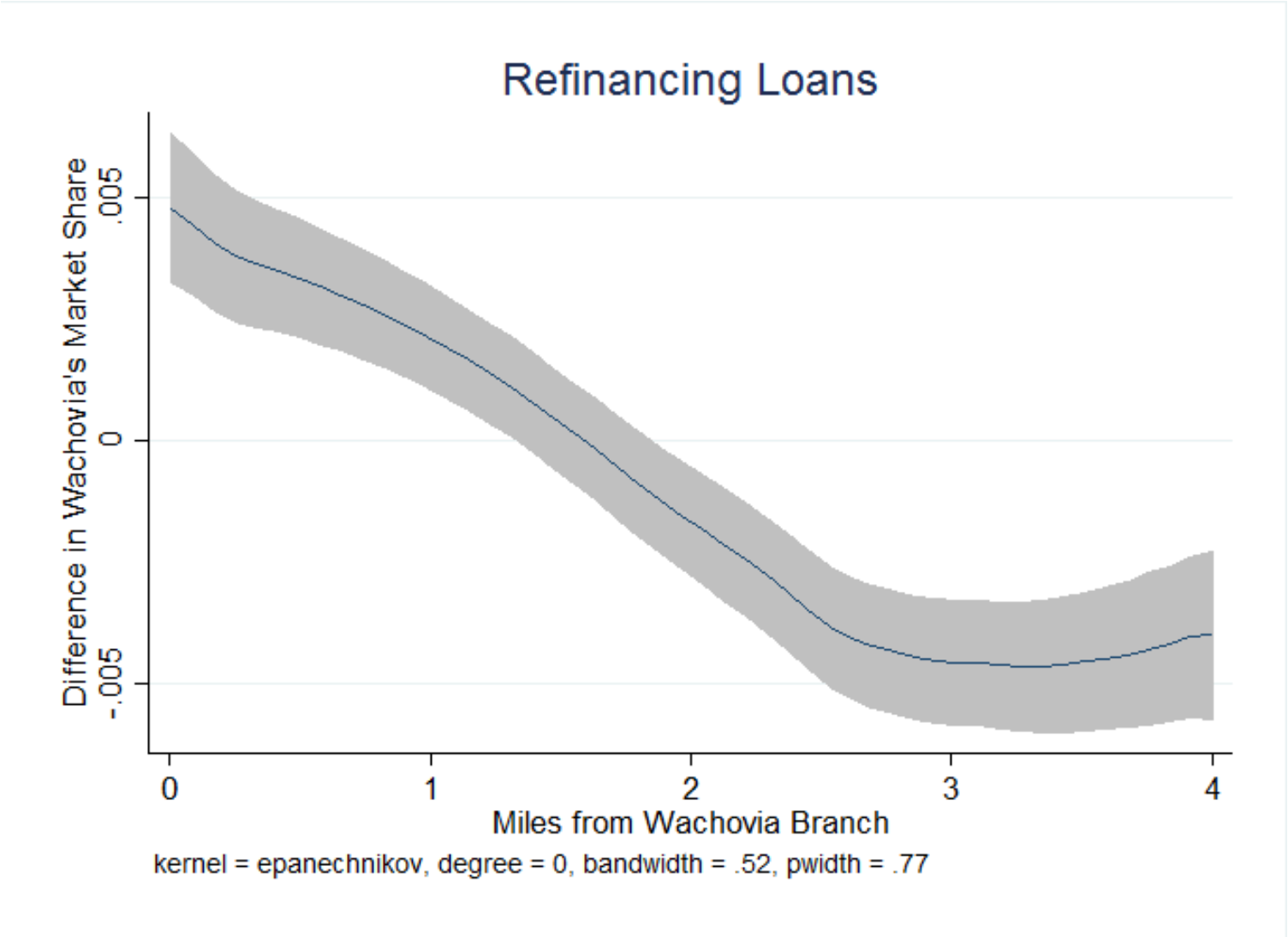

VALIDITY OF THE SHOCK

- Wachovia contracted household access to credit

- Local exposure to Wachovia matters

- Exposure to Wachovia is not correlated with other shocks
  - No important correlations with important pre-crisis observables

HOME PURCHASE CREDIT

$$\frac{Loans_{i,t}}{Loans_{i,2007}} - 1 = \beta_t Wachovia\ Exposure_i + e_{it}$$

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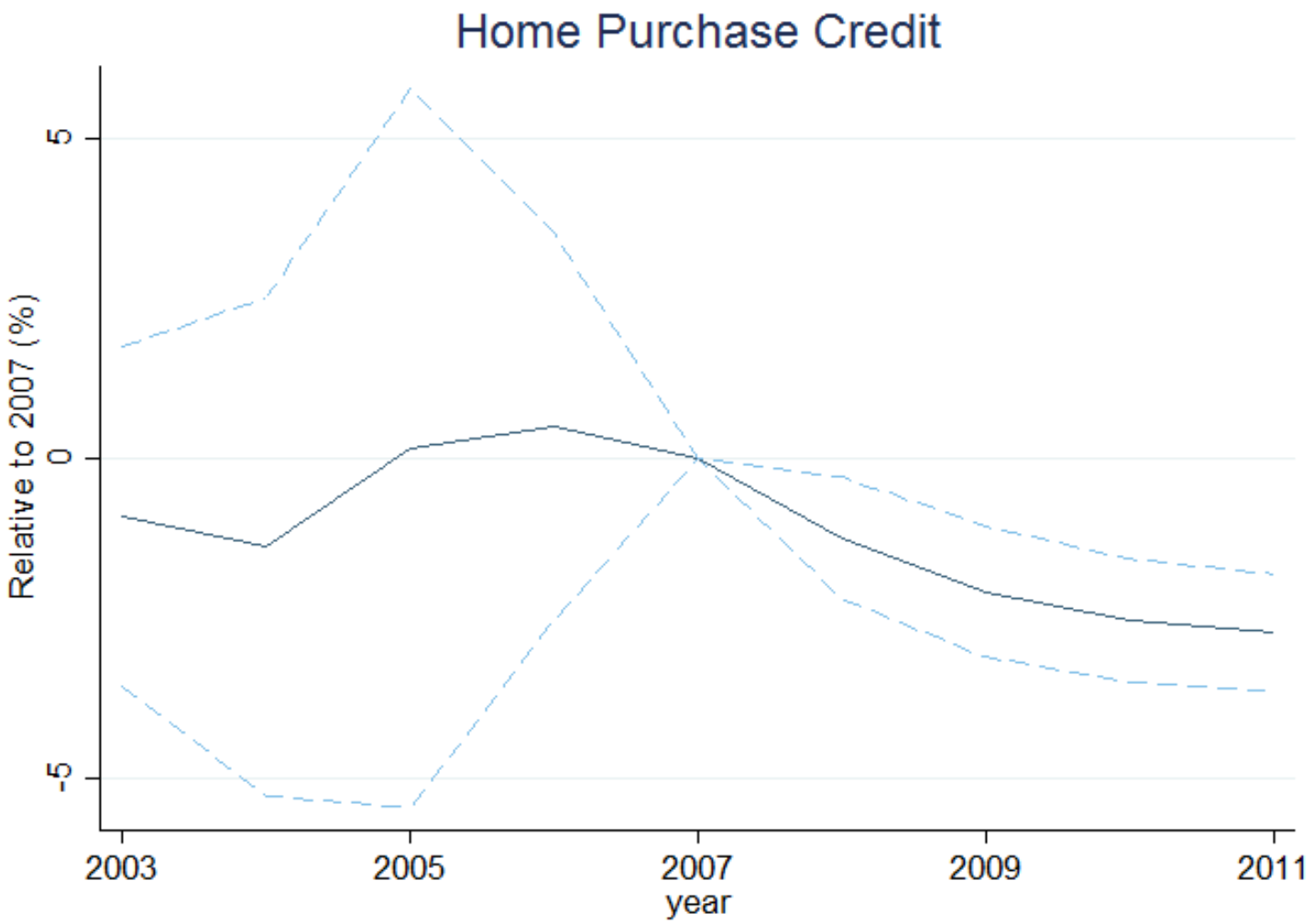
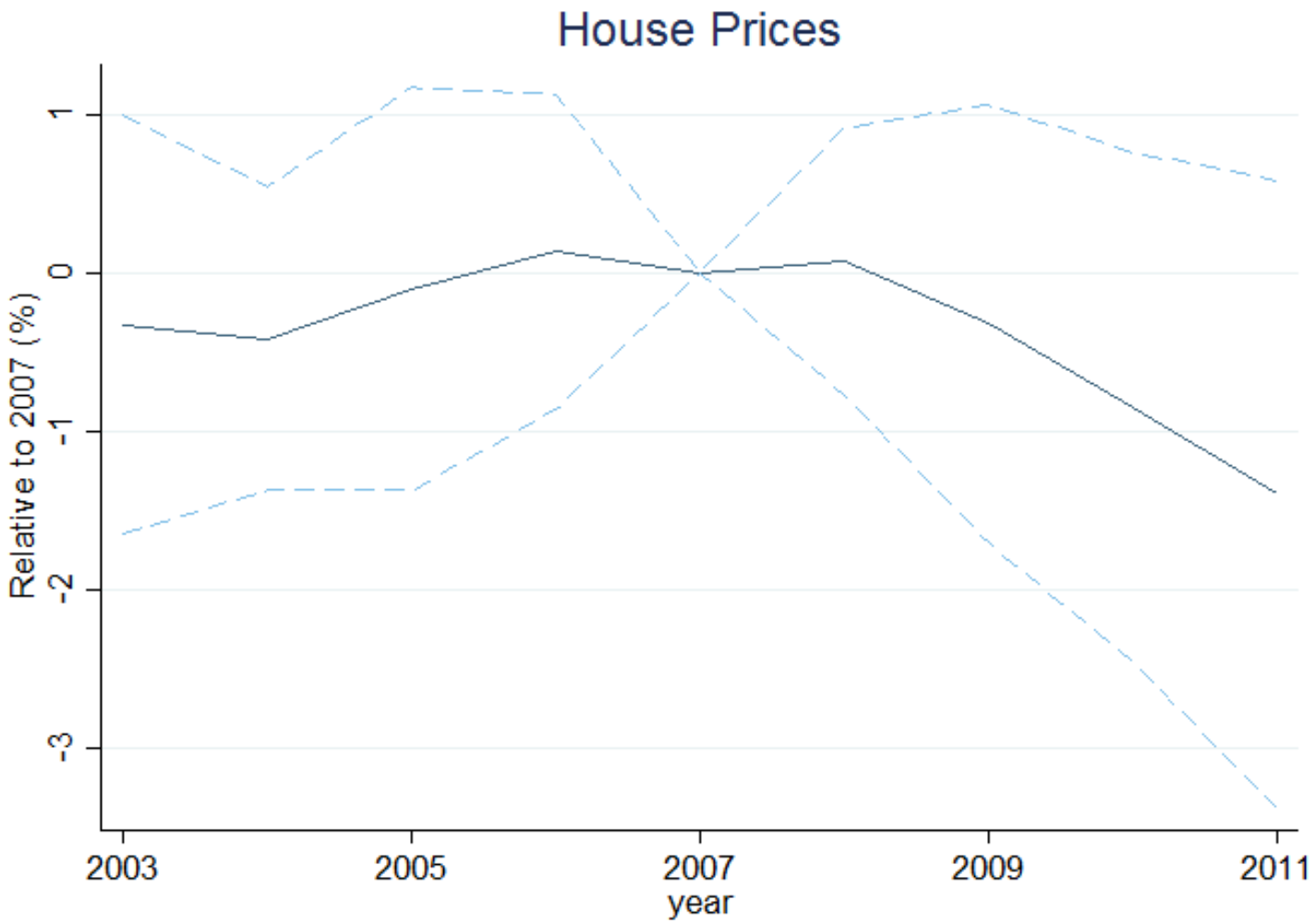


HOUSE PRICES

$$\frac{HPI_{i,t}}{HPI_{i,2007}} - 1 = \beta_t Wachovia\ Exposure_i + e_{it}$$



WHY MIGHT EXPOSURE TO WACHOVIA MATTER?

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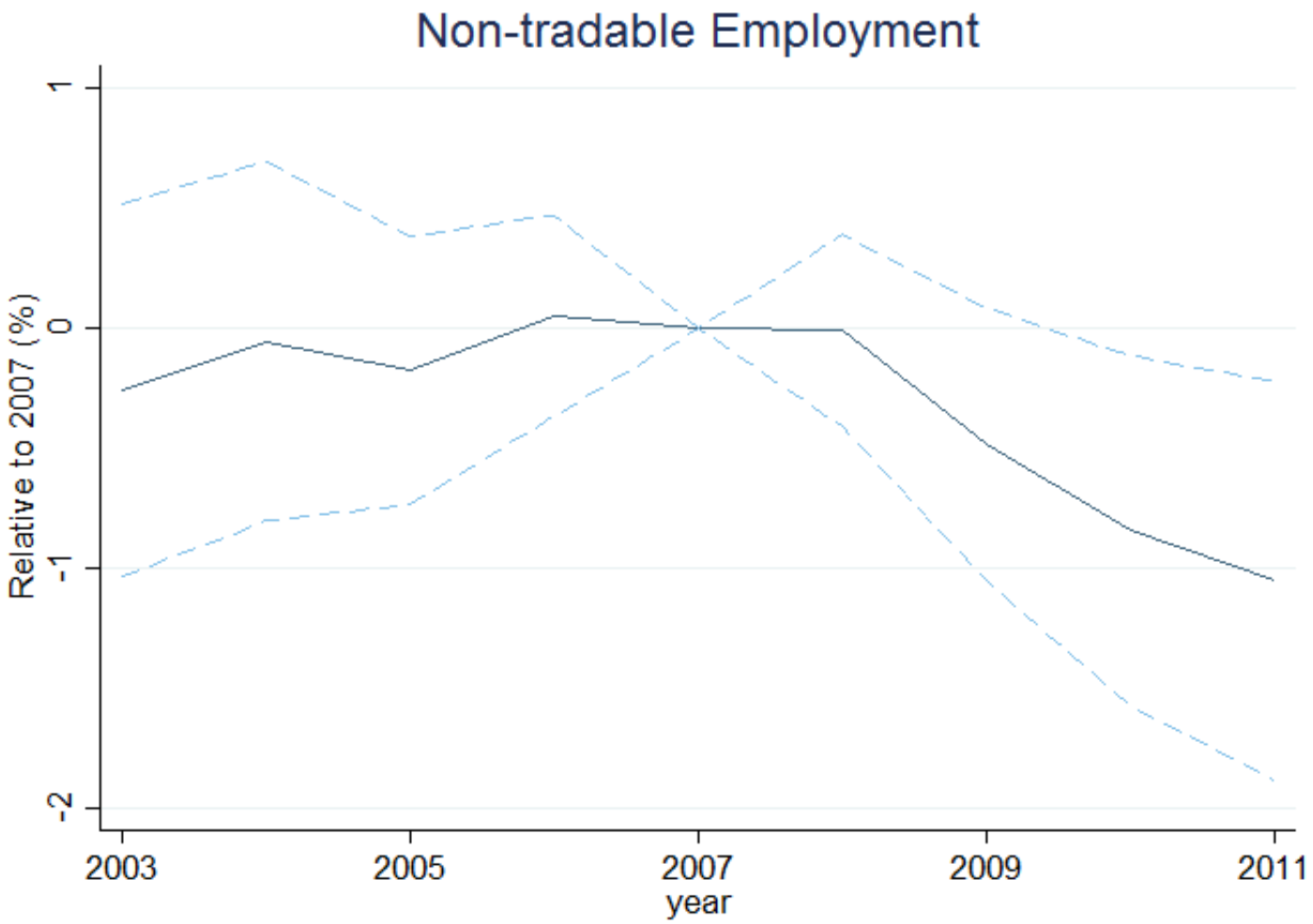
- Housing market?
  - Declines in house prices, household credit, and house sales
- Household demand for non-housing expenditures?
  - Decline in retail expenditures
- Employment?

NON-TRADABLE EMPLOYMENT

$$\frac{Emp}{Emp_{i,2007}} - 1 = \beta_t Wachovia\ Exposure_i + e_{it}$$



EFFECT OF WACHOVIA ON NON-TRADABLES 2007-2010

$$\hat{E}_i = \beta Wachovia\ Exposure_i + e_i$$

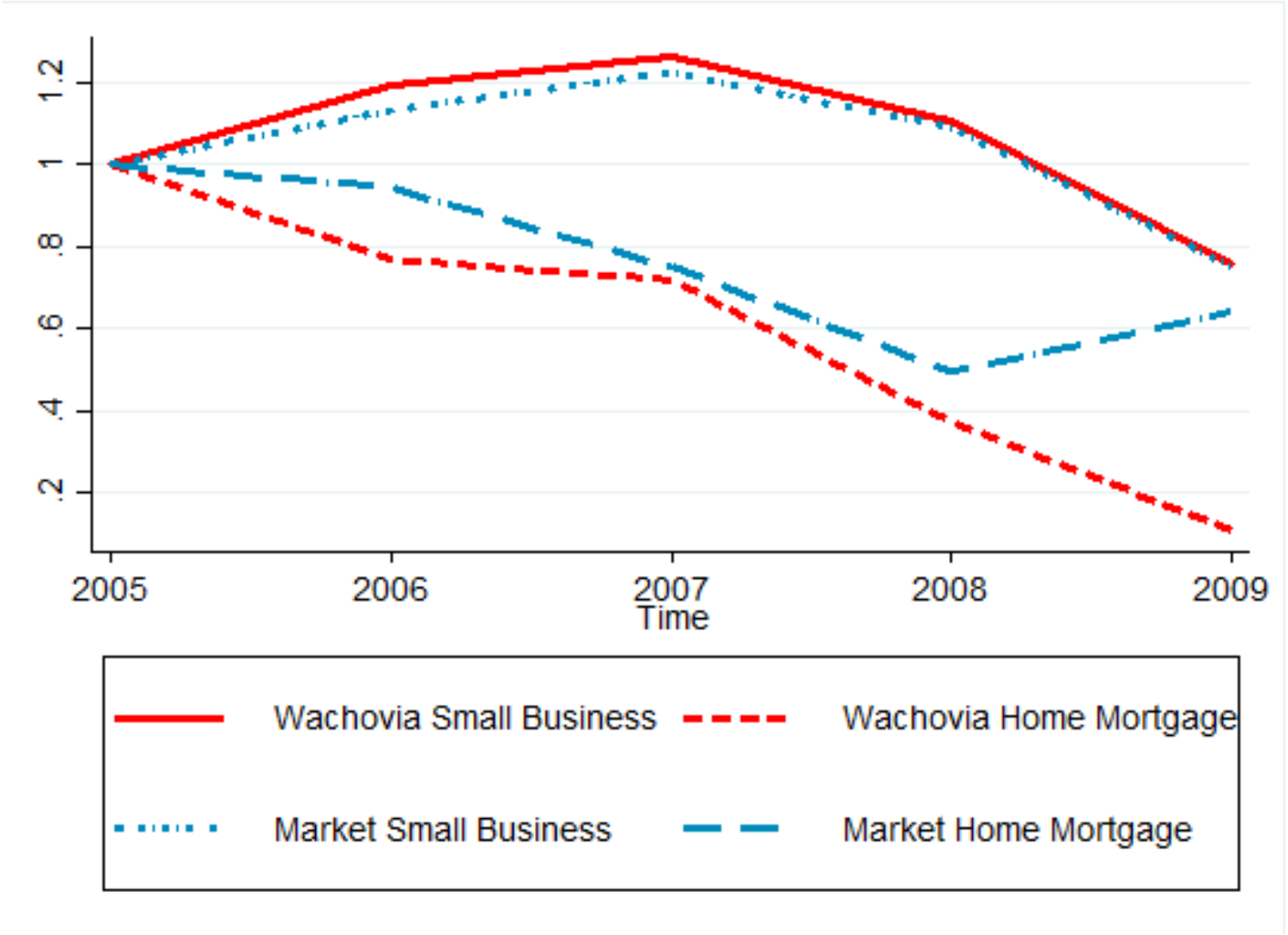
	Employment	Employment + State FE	Payroll	Payroll + State FE
Wachovia Exposure				
β	**-0.874**	**-0.662**	**-0.933**	**-0.850**
p	0.000	0.180	0.006	0.006
(CI 95%)	(-1.308, -0.439)	(-1.608, 0.285)	(-1.586, -0.281)	(-1.586, -0.281)
N	478	478	478	478
Clusters	25	25	25	25
R^2	0.095	0.314	0.049	0.129
F	5.311	3.156	7.413	7.996

- Counties in the East and South with at least 50,000 residents and CCP, weighted by 2006 population
- Controls: mortgage leverage

WHY MIGHT EXPOSURE TO WACHOVIA MATTER?

- Housing market?
  - Declines in house prices, household credit, and house sales
- Household demand for non-housing expenditures?
  - Decline in retail expenditures
- Employment?
  - Declines in total employment driven by non-tradables and residential construction
- Shock to household or firm credit markets?

HOUSEHOLD AND FIRM CREDIT ORIGINATIONS



NON-TRADABLES AND SMALL BUSINESS CREDIT?

$$\hat{E}_i = \beta_1 * Wachovia\ (HMDA) + \beta_2 * Wachovia\ (CRA) + e_i$$

	Baseline	+ High Exposure to Wachovia (CRA)	Both discrete	Both continuous
$\boldsymbol{\beta_1}$	**-0.662**	**-0.637**	**-0.027**	**-0.444**
p	0.180	0.136	0.090	0.542
(CI 95%)	(-1.608, -0.285)	(-1.732, 0.310)	(-0.060, 0.005)	(-1.818, 0.930)
$\boldsymbol{\beta_2}$		-0.002	0.003	0.020
p		0.362	0.450	0.352
(CI 95%)		(-0.027, 0.023)	(-0.031, 0.037)	(-0.019, 0.060)
N	478	478	478	478
Clusters	25	25	25	25
R^2	0.315	0.314	0.315	0.316
F	7.114	2.172	7.114	2.876

WHY MIGHT EXPOSURE TO WACHOVIA MATTER?

- Housing market?
  - Declines in house prices, household credit, and house sales
- Household demand for non-housing expenditures?
  - Decline in retail expenditures
- Employment?
  - Declines in total employment driven by non-tradables and residential construction
- Shock to household or firm credit markets?
  - Results driven by exposure in household credit market

HOUSEHOLD CREDIT AND EMPLOYMENT 2007-2010

$$\hat{E}_i = \gamma \hat{L}_i + e_i, \quad \gamma = \frac{\beta^{ES}}{\beta^{LS}}$$

	Total			
	OLS	2SLS	2SLS + State FE	2SLS CZ
Household Credit				
γ	**0.147**	**0.388**	**0.288**	**0.300**
p	0.000	0.000	0.096	0.000
(CI 95%)	(0.105, 0.189)	(0.224, 0.552)	(-0.079, 0.656)	(0.172, 0.428)
N	478	478	478	289
Clusters	25	25	25	24
R^2	0.139			
Robust F		28.187	2.162	26.445

- Counties/Commuting zones in the East and South with at least 50,000 residents and CCP, weighted by 2006 population

RESULTS SO FAR

- Exposure to Wachovia mattered because of household credit
  - Retail expenditures and housing sales responds sharply
  - Employment effects concentrated in non-tradables and residential construction
  - Direct employment losses from Wachovia collapse were significant: between .6% and 1%
  - Elasticity of employment with respect to household credit large: $\frac{\beta^{ES}}{\beta^{LS}} \approx 0.3$

- Contraction in supply of credit to households a potentially important cause of employment losses
  - Decline in employment due to supply shocks to household credit = $\frac{\beta^{ES}}{\beta^{LS}} \times \hat{L}_S$

ACCOUNTING FOR HOUSEHOLD CREDIT

$$Aggregate\ Direct\ Contribution \equiv \text{AVERAGE DIRECT EFFECT} \times \sum_i \omega_i \text{SHOCK}_i$$

I construct a measure of the actual shock: $s_i = \pi \hat{S}_i + error_i$

With this measure I can estimate: $\hat{E}_i = \gamma_s s_i + e_i$

Which lets me calculate:

$$Aggregate\ Direct\ Contribution + ERROR$$

MEASURING THE SHOCK TO A COUNTY

Greenstone, Mas, and Nguyen (2014): regress changes in lender-county credit flows on lender and county/borrower fixed effects. Can use lender fixed effects

$$\hat{L}_{ij} = \rho_j * \text{Lender}_j + \alpha_i * \text{County}_i + e_{ij}$$

Related to Amiti and Weinstein (2013), Chodorow-Reich (2014), and Niepmann and Schmidt-Eisenlohr (2013)

Measured shock to a county

$$S_i = \sum_j \omega_{ij} \rho_j$$

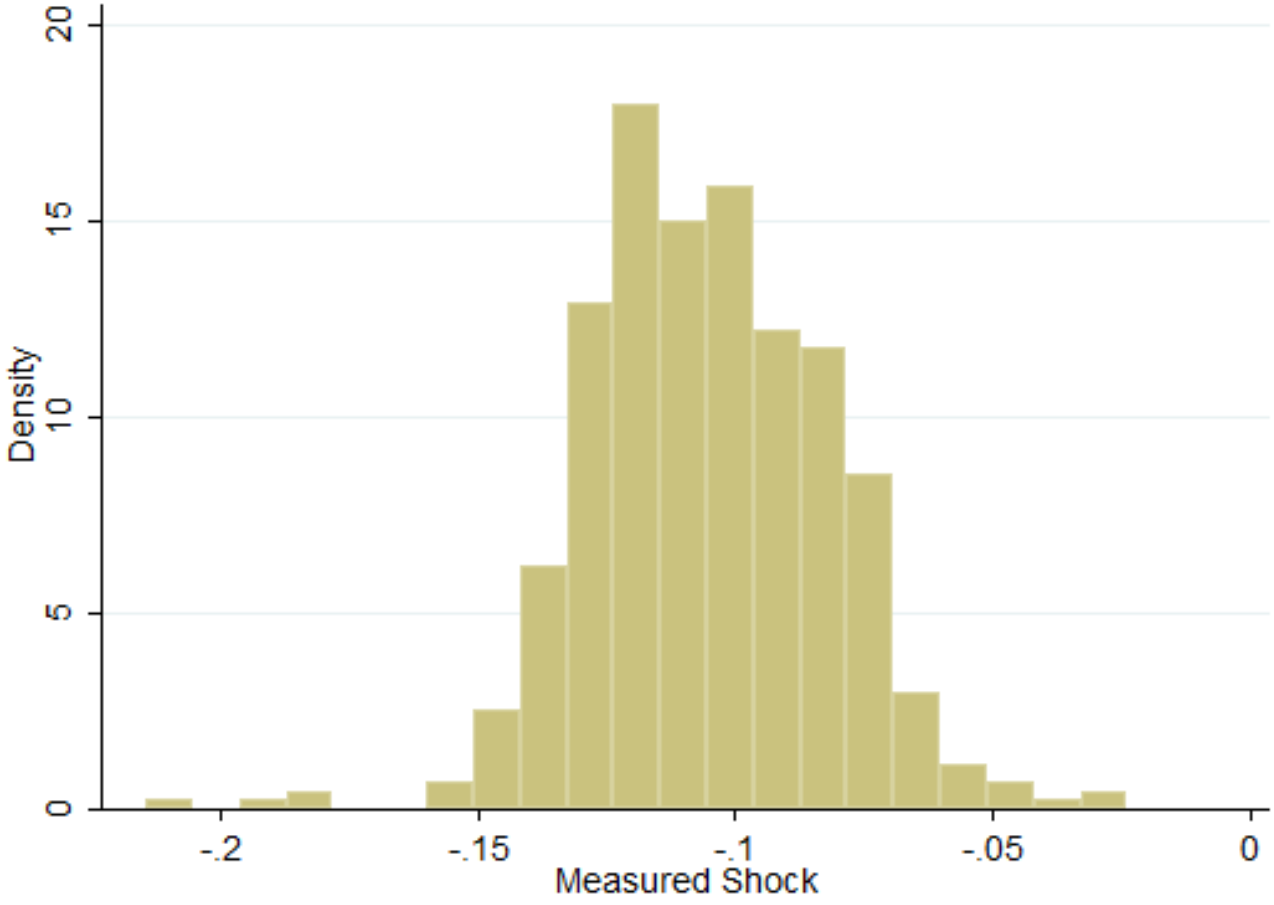
- Agnostic about source of shocks

ESTIMATING LENDER SHOCKS

$$\hat{L}_{ij} = \rho_j * \text{Lender}_j + \alpha_i * \text{County}_i + e_{ij}$$

- Use lender-county credit flows on all counties in HMDA from 2005-2006 to 2008-2009
- Restrict sample to lenders operating in at least 30 counties
- Gives 360 lenders with over 67,000 observations
  - Median lender operates in 64 counties, interquartile range is 74
- 52% of HMDA originations and purchases in 2005-2006, 66% in 2008-2009 (composition).

AGGREGATION



Subtract average of high-shock counties from all shocks

AGGREGATE DIRECT CONTRIBUTION AND SHARE OF OBSERVED TOTAL DECLINE

$$lower\ bound = \text{AVERAGE DIRECT EFFECT} \times \sum_i \text{SHOCK}_i - correction$$

	Total OLS	Total 2SLS
No Adjustment – South and East	-6.8 (112%)	-11.8 (196%)
75th Percentile – South and East	-2.1 (34%)	-3.6 (60%)
75th Percentile – National	-2.6 (37%)	-4.5 (64%)

CONCLUSION

- Shocks to household credit supply mattered
  - Frictions in household credit market: areas exposed to Wachovia experienced larger declines in housing and non-housing expenditures
  - Employment losses concentrated in residential construction and non-tradables
  - Elasticity of employment with respect to supply-driven declines in household credit large (about 0.3)

- Used relatively little structure to quantify size of shock
  - Direct effects of shocks imply declines equivalent to 30-60% of observed decline

Future Work

- How/why were households relying on credit?
- Direct liquidity effect vs. news effect?
- What observables account for the variation across lenders?
- Why do there seem to be large frictions in the household credit market?
- Policy response to distressed institutions