EFFECTS OF FISCAL POLICY ON CREDIT MARKETS

Alan J. Auerbach
UC Berkeley and NBER

Yuriy Gorodnichenko
UC Berkeley and NBER

Daniel Murphy
Darden School of Business
University of Virginia

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Abstract: Credit markets typically freeze in recessions: access to credit declines and the cost of credit increases. A conventional policy response is to rely on monetary tools to saturate financial markets with liquidity. Given limited space for monetary policy in the current economic conditions, we study how fiscal stimulus can influence local credit markets. Using rich geographical variation in U.S. federal government contracts, we document that, in a local economy, interest rates on consumer loans decrease in response to an expansionary government spending shock.

Keywords: countercyclical policy, fiscal policy, credit, banking, transmission.

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1. Introduction

Credit markets typically freeze in recessions: access to credit declines and the cost of credit increases. A conventional policy response is to rely on monetary tools to saturate financial markets with liquidity. Given limited space for monetary policy in the current economic conditions (e.g., interest rates remain low, additional rounds of quantitative easing may run into diminishing returns, and liquidity is abundant), there is an urgent need to explore the potency of other tools for restarting credit markets in economic downturns.

Government spending has traditionally been considered a counterproductive policy tool for stimulating credit. Standard Keynesian and neoclassical theories predict that an increase in government spending raises interest rates, thereby lowering private-sector spending and investment. But there is a dearth of evidence to support the notion that government spending tightens credit markets (see Murphy and Walsh 2018 for a review). To the contrary, a growing body of evidence from the United States and other advanced economies suggests that government spending can cause a decline in long-term interest rates (e.g., Miranda-Pinto et al. 2019). These studies point to a gap in economists' understanding of the relationship between fiscal stimulus and credit markets.

In this paper we bring detailed panel data on Department of Defense (DOD) contracts across U.S. cities to bear on the question of how government spending affects credit markets. We merge our data on DOD contracts with RateWatch[1] data on interest rates for a range of consumer loan products. After documenting tangible variation in interest rates across locations, we find that increases in DOD spending in a city cause a significant *decline* in local interest rates. Given that demand for credit—often proxied with car registrations—increases in response to government spending shocks (e.g., Auerbach et al. 2019a), we infer that the rate reduction is due to an expansion of credit supply.

We propose and test two channels through which DOD spending could increase credit supply. First, DOD spending could be associated with an injection of liquidity into the local economy. If credit markets are segmented across cities (in particular, if local bank branches can set rates that differ from national rates for similar consumer loans), then the injection should lower interest rates broadly in its location. Second, DOD expansions can lower lenders' assessed riskiness

[1] https://www.rate-watch.com/

of local borrowers (e.g. by lowering the probability of a local recession), hence reducing local risk premia. The second channel could operate even if credit markets are integrated across locations.

A number of features of the data allow us to explore these channels. The DOD data include information on the location of the contractor, the date the contract was signed, the amount of the contract obligation, and the duration of the contract. From this information we construct a measure of quarterly outlays. As discussed by Auerbach et al. (2019b, henceforth AGM), these outlays include payments from the DOD for production that would have occurred anyway ("wealth transfers")—either because the outlay was anticipated or because firms smooth production over lumpy contracts—as well as payments for new production. We filter out the new production component using a Bartik (1991) type instrument, as proposed by AGM, which allows us to distinguish between the effects of anticipated outlays (liquidity injections) and the effects of new demand for local production. The RateWatch data include a range of interest rates charged by local lenders, including mortgages of varying duration, auto loans for new and used cars of varying duration, and home equity lines of credit (HELOC) with different loan-to-value (LTV) ratios. By combining the DOD data with the RateWatch data, we can examine how different components of DOD spending affect interest rates for different types of loans.

We find that outlays (which primarily reflect "wealth transfers") lower broad categories of interest rates, indicating that outlays are associated with an inflow of liquidity into local credit markets. We also find that DOD spending associated with new production lowers rates, and the effect is approximately an order of magnitude larger than the effect of "wealth transfers". This differential response is consistent with a decrease in local risk premia: outlays that are associated with new production and increased worker earnings cause a stronger interest rate reduction than liquidity injections. Furthermore, new production causes a stronger decline in interest rates that tend to be risker. For example, we find that rates on (potentially higher-risk) loans for used automobiles fall more strongly than rates on (potentially low-risk) loans for new automobiles.

Our results indicate that government spending can indeed spur credit provision, both by injecting liquidity through contractors' balance sheets and possibly by lowering risk premia. The reduction in risk premia may be associated with lenders' upward revision in the likelihood that lenders will repay, due to increased demand for local production and hence increased current and future earnings.

In addition to providing new evidence on the effects of fiscal policy on credit markets, our evidence contributes more broadly to the literature on regional credit market integration and the role of local bank branches in provision of local credit. For example, recent work documents that local liquidity shocks cause an increase in mortgage originations by banks that have branches in the location (Gilje, Loutskina, and Strahan 2016). We examine credit responses among different types of loans to both local production shocks and liquidity shocks, and we find that rates on the types of loans that are less likely to be securitized (e.g., HELOC and auto loans) are more responsive to local shocks.[2]

Our evidence also contributes to recent work on the effects of capital flows into a local economy, as our measure of outlays is akin to capital injections that have been explored in the empirical capital flow literature (e.g., Blanchard et al., 2016). We find that capital injections expand credit markets even in a monetary and banking union, although the effect is smaller than the effect of a production (export) demand shock.

2. Data and Methodology

Our analysis relies on regional variation in DOD spending. Apart from DOD contracts being plausibly exogenous to local conditions, DOD spending does not directly influence utility of households or infrastructure in an area receiving a DOD spending shock. These properties give us a better chance to isolate potential channels of demand shocks. The main outcome variable in our analysis is the price of consumer loans. We conduct our analysis at the unit of the city-quarter, where city is defined as a core-based statistical area (CBSA). We restrict our analysis to cities with population greater than 50,000. Descriptive statistics are reported in Appendix Table 1.

A. Government Spending Data

Our data on DOD contracts is from USAspending.gov. The data contain detailed information on contracts signed since 2000, including the date of new contract obligations, the duration of the contract, the amount of the contract, and the zip code in which the majority of work is performed. AGM and Demyanyk et al. (2019) use this information to construct annual outlays associated with

[2] Loutskina (2011), Figure 1 documents securitization rates among loans in the U.S. economy. Home mortgages exhibited securitization rates of just below 60% in the 2000s, while securitization rates for other consumer loans were below 30%.

each contract. We adapt their approach to construct a measure of outlays at the quarterly frequency.[3] We then aggregate the quarterly series of contract-level outlays to the city level. AGM and Demyanyk et al. (2019) provide additional details on the DOD data.

As emphasized by AGM, DOD outlays consist of payments for new production as well as payments for production that would have occurred anyway, either because the specific contract was anticipated or because firms smooth production over lumpy contracts. We follow AGM and extract the component of DOD spending that is associated with new production by instrumenting for outlays with a Bartik-type instrument. We merge information on DOD contracts with employee earnings by location from the Quarterly Census of Employment and Wages (QCEW), which we use to scale changes in DOD outlays.

B. Data on Interest Rates

We use data provided by RateWatch to construct series of local interest rates. RateWatch surveys bank branches across the country and gathers information on a wide spectrum of consumer loan products and limited information on business loans. The RateWatch data begin in 2001 and include information on the date on which an institution was surveyed, the specifics (including the interest rate) of different loan contracts, and the identity of the branch responsible for setting the interest rate. The reporting branch is in the same city as the rate-setting branch in approximately 90 percent of the sample. For each type of consumer loan, financial institutions report the interest rate that applies to their most credit-worthy borrowers. They also report other features of loans when applicable, including fees, time to maturity, loan-to-value (LTV) ratios, balloon rates, and other loan costs.

We construct city-level series of broad categories of interest rates (e.g., Auto Loans), as well as for rates on specific loan products (e.g., used car loans with a maturity of 60 months). For each interest rate series, we take the average rate across surveyed institutions in a city-quarter. Figure 1 shows the historical distribution of various interest rates across cities since 2001. Appendix Figures 1 and 2 plot the distribution for more narrowly defined loan products (e.g., 30-year fixed mortgage of $175,000). There is substantial regional variation in rates, particularly for HELOC (home equity lines of credit) loans and auto loans. Rates on mortgages exhibit far less variation across cities, likely

[3] In particular, we divide the total amount of the obligation by the number of quarters specified in the contract and we allocate outlays equally across quarters. For example, a contract that specifies $1 million to be paid over two years is associated with $125,000 in outlays in each of the eight quarters.

due to the fact that mortgage loans are typically securitized rather than held on local banks' balance sheet, which drives stronger integration of rates across locations. Appendix Figures 3-5 plot the historical evolutions of cross-city coefficients of variation for broad categories of interest rates. The dispersion in rates has increased since 2009, particularly for auto loans.

C. Econometric specification

Following AGM, our baseline specification is a projection of interest rates on DOD outlays and lags of outlays, lags of earnings, lags of interest rates, and city and time fixed effects:

$$r_{\ell,t} - r_{\ell,t-4} = \beta \frac{G_{\ell,t} - G_{\ell,t-4}}{Y_{\ell,t-4}} + \sum_{s=1}^{m} \alpha_s \frac{Y_{\ell,t-s} - Y_{\ell,t-s-4}}{Y_{\ell,t-s-4}} + \sum_{s=1}^{m} \delta_s \frac{G_{\ell,t-s} - G_{\ell,t-s-4}}{Y_{\ell,t-s-4}} + \sum_{s=1}^{m} \phi_s \left(r_{\ell,t-s} - r_{\ell,t-s-4}\right) + \psi_\ell + \alpha_t + error_{\ell t}, \quad (1)$$

where ℓ and t index cities and time (quarters), $r_{\ell,t}$ is the interest rate for a given type of consumer loans, $G_{\ell,t}$ is the DOD outlays, $Y_{\ell,t}$ is labor earnings, and ψ_ℓ and α_t are city and time fixed effects. Each of our data series exhibits seasonality, the strength of which varies across cities. To uniformly account for this seasonality, we examine differences (or growth rates) over four quarters rather than over a single quarter.

The coefficient of interest is β, which estimates the effect of a percent (relative to lagged labor earnings) increase in DOD outlays on the change in interest rates. We also examine specifications in which we replace $r_{\ell,t} - r_{\ell,t-4}$ with $r_{\ell,t+4} - r_{\ell,t-4}$ as the regressand to examine effects 4 quarters after the DOD shock.

To isolate the component of DOD spending that is associated with new production, we instrument DOD spending and its lags with Bartik (1991) shocks. Specifically, we instrument for $\frac{G_{\ell,t-s} - G_{\ell,t-4-s}}{Y_{\ell,t-4-s}}$ $(s \in \{0,1,2,3,4\})$ with $\frac{\tilde{G}_{\ell,t-s} - \tilde{G}_{\ell,t-4-s}}{Y_{\ell,t-s-4}} \equiv \frac{S_\ell \times (G_{t-s} - G_{t-4-s})}{Y_{\ell,t-s-4}}$, where G_t is the national defense spending in quarter t and S_ℓ is city ℓ's average share of national DOD spending. AGM provide a discussion of why the Bartik shock extracts the component of DOD spending associated with new production filters out the "wealth transfer" component of DOD spending.

3. Empirical Results

Table 1 shows the contemporaneous effect of DOD outlays on various interest rate measures.[4] Column 1 reports the coefficient of interest from the OLS specification, which we interpret as the effect of a DOD-induced liquidity injection. Column (3) reports the coefficient of interest from the specification in which outlays are instrumented with the Bartik shock, which we interpret as the effect of demand for new production.

Interest rates fall for a range of consumer loans, with HELOC and auto loans exhibiting the strongest responses. For example, a percent increase in DOD outlays (relative to local labor earnings) is associated with a 0.24-basis-point reduction in auto loan rates and a 0.30-basis-point reduction in high-LTV HELOC rates. Outlays associated with new production (column 3) cause a stronger reduction in rates by an order of magnitude. Rates on short-term loans for used autos decline the most, falling by 3.08 basis points in response to a percent increase in DOD spending. There is some evidence of declines in mortgage rates in response to both wealth transfers and new production, although the magnitudes are smaller than the declines in rates on other loans. We find no statistically significant response for interest rates on credit cards.

The results in Table 1 are consistent with the notion that government spending relaxes credit markets, both through a liquidity injection channel and by reducing the perceived riskiness of borrowers. The specifications in column (1) are based on raw (uninstrumented) DOD outlays (wealth transfers) that are derived from prior contract obligations and are therefore potentially anticipated. These transfers do not contain new information; nor do they have strong direct effects on labor earnings of local workers (as documented in AGM). Therefore, they simply represent liquidity injections into the local economy. We conjecture that these transfers might reduce local rates because they are recorded as new earnings on the balance sheets of local contractors. The balance sheet improvement for contractors is associated with improved balance sheets for local banks that lend to the contractors, which facilitates an expansion of credit.[5] This expansion is particularly pronounced for less-secure loans (e.g., loans for used autos and for high-LTV HELOC) for which local banks are likely to have a comparative advantage in the provision of soft information (e.g., Ergungor 2010).

[4] The responses at a one-year horizon are reported in Appendix Table 2. The results are consistent with those in Table 1 although the effects are generally smaller and measured with less precision.

[5] Note that the balance sheet expansion here is different from a balance sheet expansion that operates through monetary policy. Here, transfers appear as income on a contractor's balance sheet and lead to a corresponding increase in firm equity (which in turn increases the value of loans on banks' balance sheets). In the case of liquidity injections from the central bank, the liquidity injection to banks is associated with a corresponding reduction in illiquid assets.

Risk premia also appear to decrease in response to DOD spending, particularly when the spending is associated with new production. Spending associated with new production causes a significant increase in workers' earnings (as documented in AGM). The stronger interest rate response to new production compared to the response to transfers is consistent with new production causing an increase in expectations of future income and wealth (Murphy 2015) and lowering the risk of default. The strong reduction in interest rates in column (3) is especially notable given that DOD production causes a strong increase in auto registrations (as documented by Auerbach et al. 2019a), which is a proxy for consumption and loan demand. Thus, interest rates fall despite an increase in loan demand, indicating a strong relaxation of credit markets due to a downward revision in perceived risk.

There is also some evidence for the risk premium channel in the differential response of rates on loans for new cars compared to rates on loans for used cars. Loans for used cars are potentially higher-risk, as they are backed by less-valuable collateral. Rates for short-term used car loans fall by 3.08 basis points in response to new DOD production, compared to a decline of 1.13 basis points for short-term loans backed by new cars, indicating a strong decline in the risk premium charged on (riskier) less-secure loans. Our evidence on risk premia is suggestive, as we do not observe changes in the composition of borrowers. It is nonetheless informative because the RateWatch data consist of interest rates charged to financial institutions' most credit-worthy borrowers for any given loan, which to some extent mitigates concerns over compositional effects.

4. Discussion

Although credit markets are strongly integrated in the U.S., we find that, even in this environment, anticipated local transfers by the federal government can have a stimulatory effect of the cost of credit. Furthermore, our evidence that transfers have a stronger effect on rates for loans that are more likely to be kept on local banks' balance sheets is consistent with recent evidence on the importance of local liquidity and local banks in the provision of credit (e.g., Gilje, Loutskina, and Strahan 2016, Ergungor 2010). Our evidence also suggests that government spending can have a mitigating effect by reducing the perceived riskiness of loans to the private sector.

The channels of credit market expansion that we document at the local level are relevant for the national effects of government spending. A distinguishing feature of national spending (relative to DOD spending in a location) is that national spending is financed within the economy,

typically through bond issuance. Although standard theories suggest that this bond issuance increases demand for credit and raises interest rates, a number of mechanisms could operate in general equilibrium to counteract this effect. For example, Auerbach and Gorodnichenko (2017) document that, in a weak economy, a fiscal stimulus can lower the cost of public debt, consistent with the stimulus reducing the risk of a deep slump. Miranda-Pinto et al. (2019) suggest that government spending can relax credit markets by redistributing income to savers. Murphy and Walsh (2018) posit that government spending transfers resources to the private sector and increases their saving, offsetting the credit-market-tightening effects of government bond issuance. Our results are consistent with these mechanisms and potentially point to a new mechanism based on a reduction in risk premia.[6]

We conclude that fiscal stimulus can not only expand output but can also contribute to lowering the cost of credit, a channel of fiscal policy transmission that has not been emphasized before. This is a valuable effect when monetary policy has limited ammunition. Furthermore, because market segmentation is amplified when financial markets are disrupted, there are potentially more opportunities for targeted interventions (Gorodnichenko and Ray 2017). Specifically, fiscal stimulus directed to areas particularly affected by a recession may be especially effective.

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[6] There is more work to be done to isolate the risk premium channel and precise mechanisms through which risk premia decline. One possibility is that government spending increases perceptions of households' and firms' future income and wealth (Murphy 2015), which reduces the risk of default.

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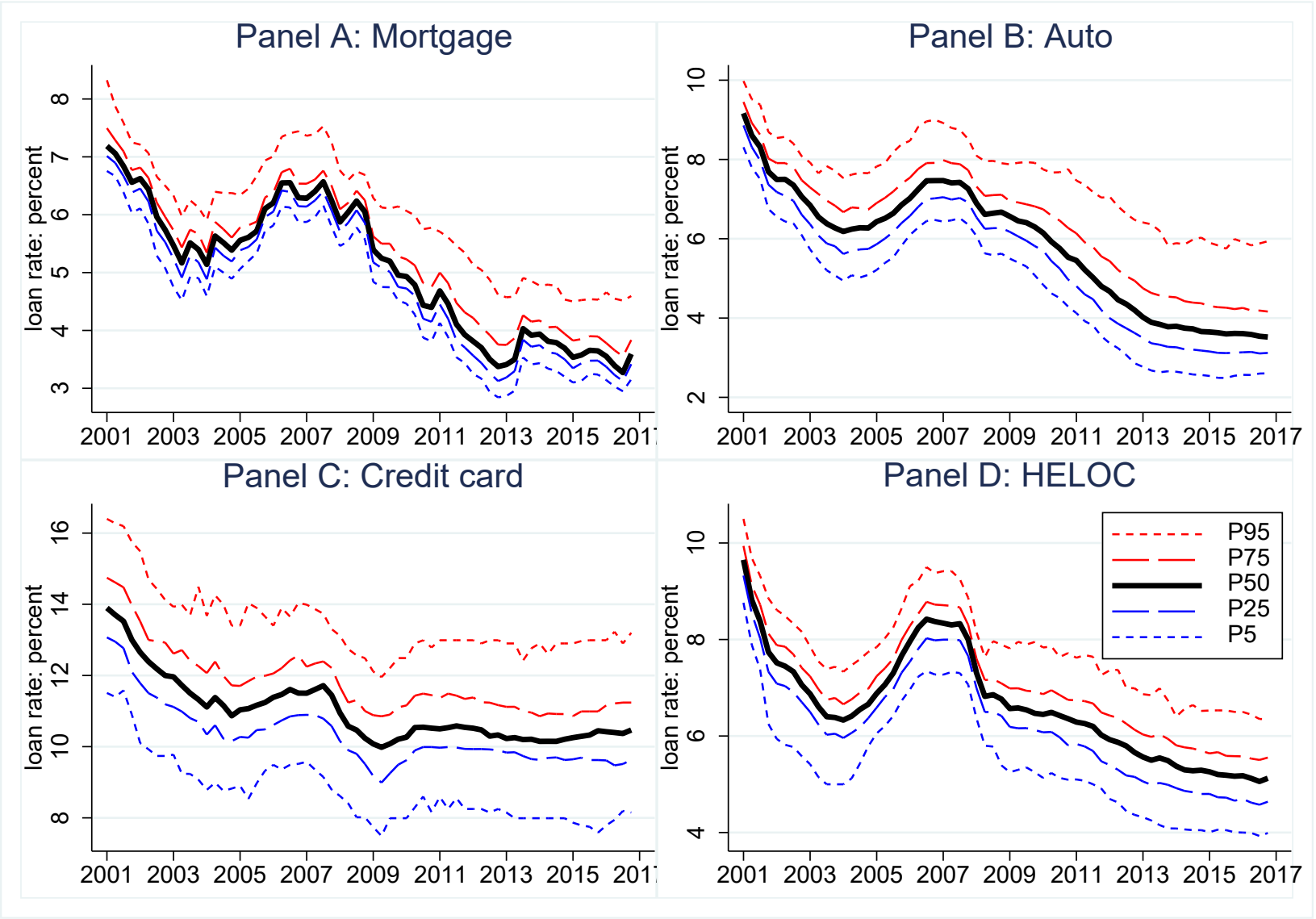
Table 1. Contemporaneous response of consumer loan rates to government spending shocks.

	OLS		IV		
	Coef./s.e.	R^2	Coef./s.e.	1-st stage F-stat	N obs.
	(1)	(2)	(3)	(4)	(5)
Mortgage					
All	-0.02	0.389	-0.14	51.3	16,510
	(0.04)		(0.33)		
30-year, fixed	-0.07*	0.299	-0.25	36.9	13,067
	(0.04)		(0.21)		
15-year, fixed	-0.08	0.343	-0.71*	44.7	14,966
	(0.05)		(0.39)		
Auto loans					
All	-0.24***	0.497	-1.26**	25.4	21,938
	(0.07)		(0.55)		
New, short	-0.25***	0.504	-1.13***	24.8	21,616
	(0.07)		(0.48)		
Used, short	-0.34**	0.481	-3.08**	24.5	18,945
	(0.15)		(1.46)		
New, long	-0.22***	0.505	-0.85	24.9	21,682
	(0.06)		(0.54)		
Used, long	-0.21*	0.433	-1.06*	22.4	15,039
	(0.13)		(0.57)		
Credit cards	0.37	0.469	-3.60	3.6	10,389
	(0.29)		(5.77)		
HELOC					
All	-0.17**	0.436	-1.27*	15.2	21,055
	(0.09)		(0.70)		
Low LTV	-0.21**	0.458	-1.77*	18.2	19,383
	(0.10)		(0.97)		
High LTV	-0.30***	0.459	-1.58*	29.0	15,163
	(0.09)		(0.83)		

Notes: The table report estimated coefficient β in specification (1). Column (1) reports OLS estimates. Column (3) reports instrumental variable estimates (Bartik instrument). Column (4) reports the Cragg-Donald Wald F-statistic for the null hypothesis that the first stage is weakly identified. Driscoll and Kraay (1998) standard errors are in parentheses. Mortgage rates are for $175,000 loans. HELOC stands for home equity line of credit. High (low) LTV correspond to $20,000 loans for a house with a loan(mortgage)-to-value ratio (LTV) greater (lower) than 80 percent of home value. For auto loans, "New" indicates that a loan is backed with a new car. "Used" indicates that a loan is backed with a used car (4 years old). "Short" and "Long" indicate the duration of loans: 3 years and 5 years respectively. Interest rates are in the annual equivalents and reported in percent. ***, **, * indicate statistical significance at 1, 5 and 10 percent levels.

Figure 1. Dynamics of consumer interest rates.



Notes: the figure reports time series for percentiles of consumer rates across CBSAs by loan type. HELOC indicates home equity lines of credit.

Appendix Table 1. Descriptive statistics.

	Levels			Q4 growth rate		
	mean	median	st.dev.	mean	median	st.dev.
	(1)	(2)	(3)	(4)	(5)	(6)
Interest rates, percent						
Mortgage						
All	5.163	5.308	1.225	-0.218	-0.231	0.595
30-year, fixed	5.378	5.563	1.149	-0.218	-0.227	0.539
15-year, fixed	4.938	5.188	1.301	-0.235	-0.239	0.570
Auto						
All	5.922	6.204	1.707	-0.303	-0.280	0.707
New, short	5.493	5.750	1.679	-0.300	-0.274	0.700
Used, short	6.304	6.580	1.935	-0.326	-0.288	0.827
New, long	5.811	6.074	1.628	-0.294	-0.265	0.685
Used, long	5.839	5.998	1.887	-0.321	-0.256	0.856
Credit card	11.030	10.900	1.681	-0.176	0.000	1.114
HELOC						
All	6.623	6.550	1.325	-0.223	-0.185	0.863
Low LTV	6.699	6.750	1.242	-0.219	-0.182	0.709
High LTV	7.348	7.407	1.345	-0.223	-0.180	0.793
Gov't spending/labor earnings	0.030	0.006	0.082	0.002	0.000	0.040

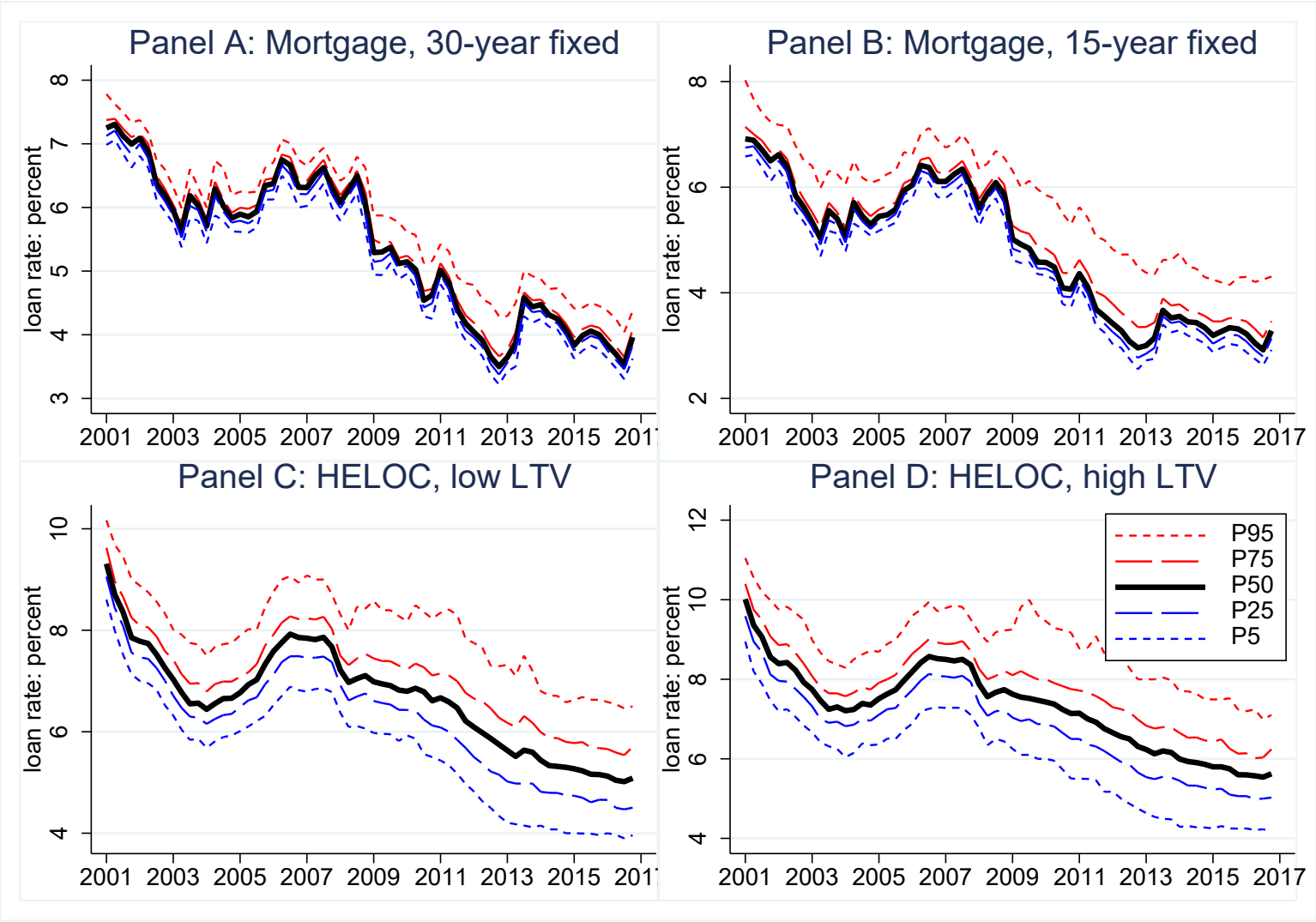
Notes: Mortgage rates are for $175,000 loans. HELOC stands for home equity line of credit. High (low) LTV correspond to $20,000 loans for a house with a loan(mortgage)-to-value ratio (LTV) greater (lower) than 80 percent of home value. For auto loans, "New" indicates that a loan is backed with a new car. "Used" indicates that a loan is backed with a used car (4 years old). "Short" and "Long" indicate the duration of loans: 3 years and 5 years respectively. Interest rates are in the annual equivalents and reported in percent. Gov't spending/labor earnings is the ratio of awarded Department of Defense contracts (outlays) to labor earnings. Columns (1)-(3) report moments for levels of the variables. Columns (4)-(6) report values for growth rates (or changes) for a given quarter relative to the same quarter in the previous year.

Appendix Table 2. One-year-after response of consumer loan rates to government spending shocks.

	OLS		IV		
	Coef./s.e.	R^2	Coef./s.e.	1-st stage F-stat	N obs.
	(1)	(2)	(3)	(4)	(5)
Mortgage					
All	-0.07	0.210	0.05	50.5	14,725
	(0.08)		(0.47)		
30-year, fixed	0.02	0.191	-0.01	30.5	11,438
	(0.06)		(0.34)		
15-year, fixed	0.05	0.190	0.09	45.3	13,263
	(0.06)		(0.39)		
Auto loans					
All	-0.19*	0.248	-0.90	12.3	19,975
	(0.10)		(1.14)		
New, short	-0.15	0.251	-0.86	12.0	19,671
	(0.11)		(1.01)		
Used, short	-0.48**	0.231	-2.70*	13.1	17,084
	(0.23)		(1.41)		
New, long	-0.00	0.246	-0.54	12.0	19,739
	(0.08)		(1.25)		
Used, long	-0.28	0.221	0.46	9.8	13,334
	(0.25)		(1.88)		
Credit cards	0.46	0.236	-7.44	0.7	9,089
	(0.33)		(18.30)		
HELOC					
All	-0.11	0.207	-1.00	6.9	19,073
	(0.14)		(1.44)		
Low LTV	-0.33***	0.197	-0.55	7.6	17,443
	(0.11)		(0.96)		
High LTV	-0.32*	0.222	-0.46	21.7	13,554
	(0.18)		(1.02)		

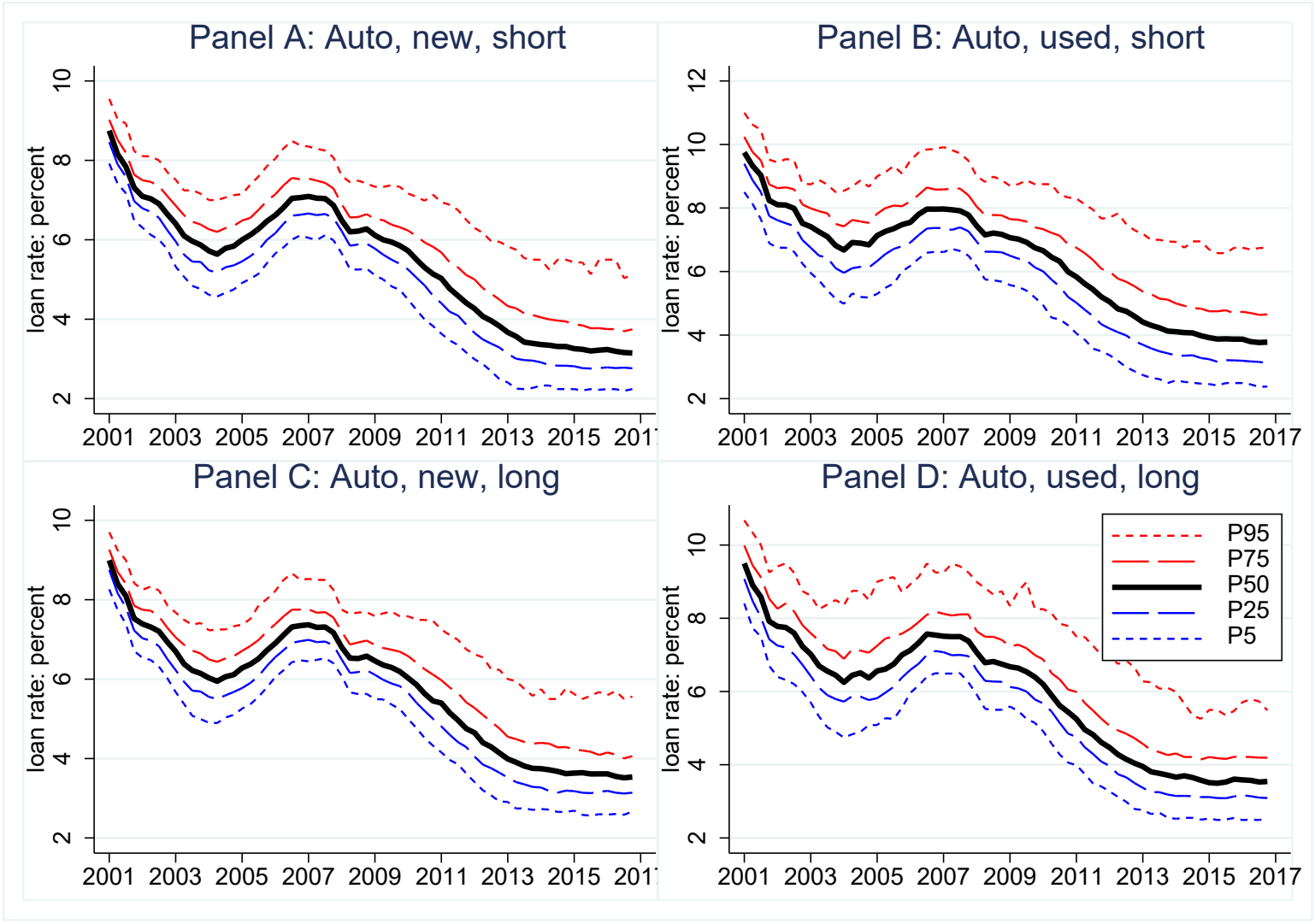
Notes: The table report estimated coefficient β in specification (1) when the regressand is $r_{\ell,t+4} - r_{\ell,t-4}$. Column (1) reports OLS estimates. Column (3) reports instrumental variable estimates (Bartik instrument). Column (4) reports the Cragg-Donald Wald F-statistic for the null hypothesis that the first stage is weakly identified. Driscoll and Kraay (1998) standard errors are in parentheses. Mortgage rates are for $175,000 loans. HELOC stands for home equity line of credit. High (low) LTV correspond to $20,000 loans for a house with a loan(mortgage)-to-value ratio (LTV) greater (lower) than 80 percent of home value. For auto loans, "New" indicates that a loan is backed with a new car. "Used" indicates that a loan is backed with a used car (4 years old). "Short" and "Long" indicate the duration of loans: 3 years and 5 years respectively. Interest rates are in the annual equivalents and reported in percent. ***, **, * indicate statistical significance at 1, 5 and 10 percent levels.

Appendix Figure 1. Dynamics of consumer interest rates, mortgages and HELOCs.



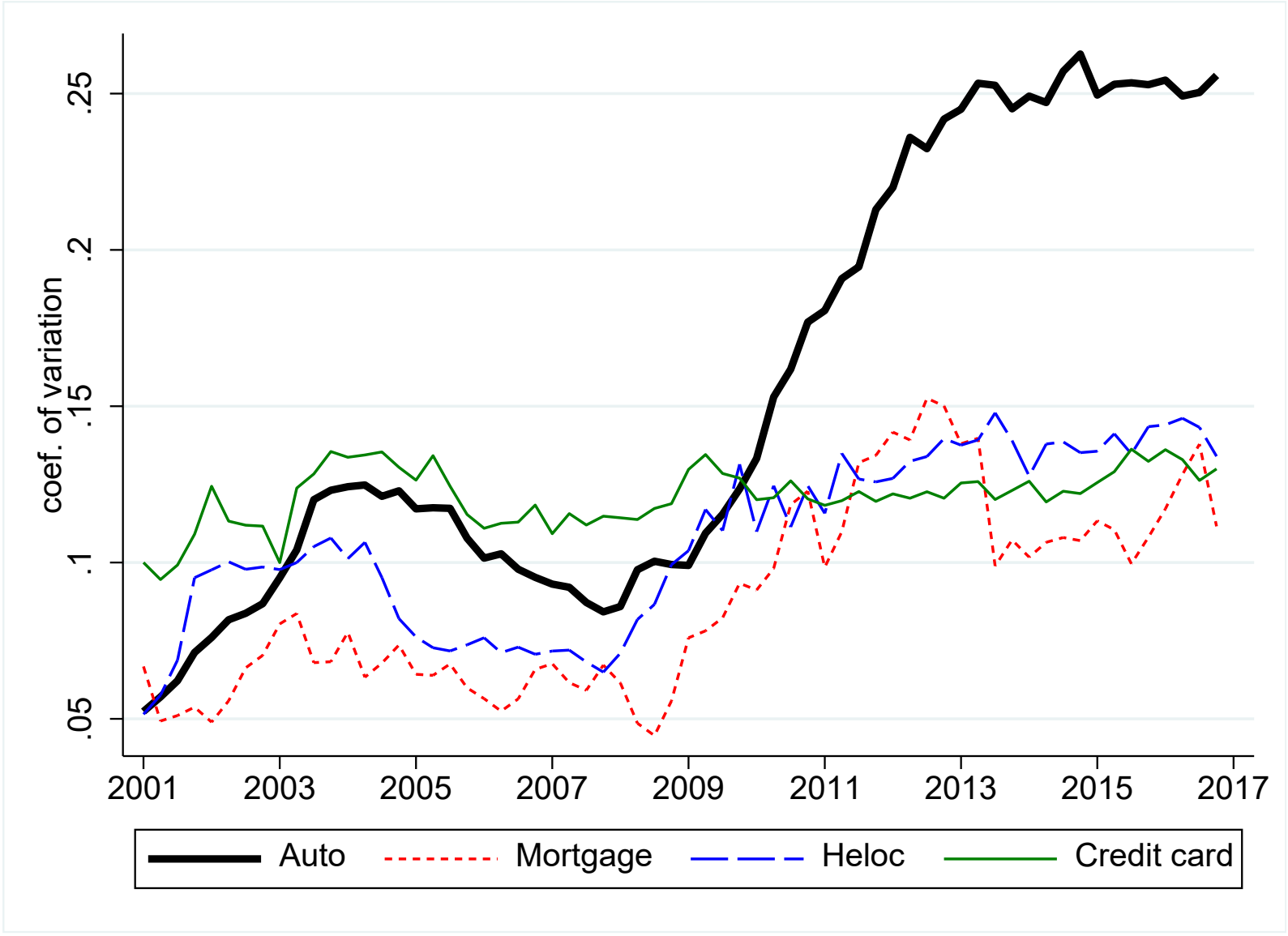
Notes: the figure reports time series for percentiles of consumer rates across CBSAs by loan type. Mortgage rates are for $175,000 loans. HELOC stands for home equity line of credit. High (low) LTV correspond to $20,000 loans for a house with a loan(mortgage)-to-value ratio (LTV) greater (lower) than 80 percent of home value.

Appendix Figure 2. Dynamics of consumer interest rates, auto loans.



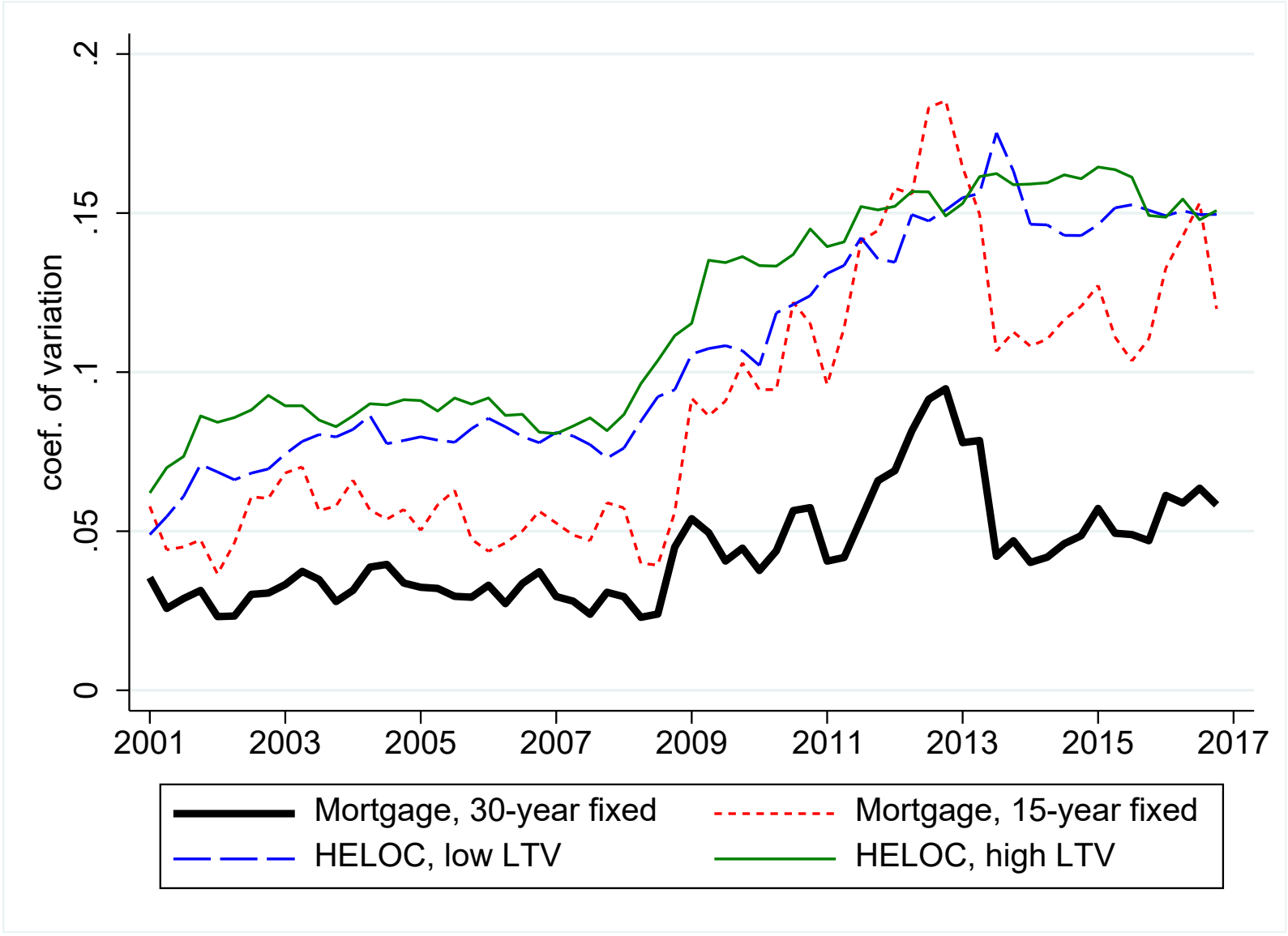
Notes: the figure reports time series for percentiles of consumer rates across CBSAs by loan type. “New” indicates that a loan is backed with a new car. “Used” indicates that a loan is backed with a used car (4 years old). “Short” and “Long” indicate the duration of loans: 3 years and 5 years respectively.

Appendix Figure 3. Coefficient of variation for consumer loans across locations.



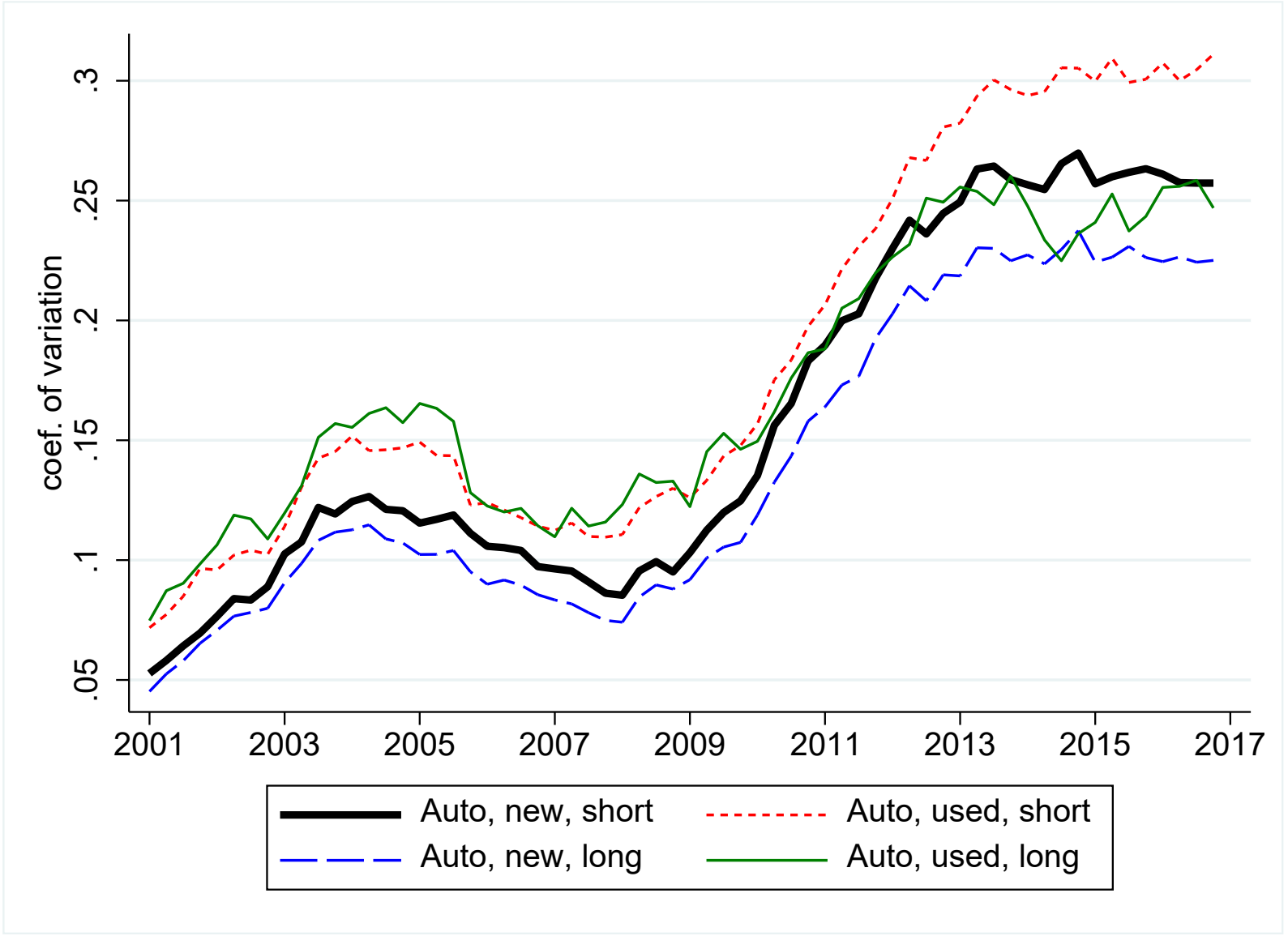
Notes: the figure reports time series for coefficient of variation by loan type.

Appendix Figure 4. Coefficient of variation for consumer mortgage and HELOC loans across locations.



Notes: the figure reports time series for coefficient of variation by mortgage/HELOC loan type. Mortgage rates are for $175,000 loans. HELOC stands for home equity line of credit. High (low) LTV correspond to $20,000 loans for a house with a loan(mortgage)-to-value ratio (LTV) greater (lower) than 80 percent of home value.

Appendix Figure 5. Coefficient of variation for consumer auto loans across locations.



Notes: the figure reports time series for coefficient of variation by auto loan type. "New" indicates that a loan is backed with a new car. "Used" indicates that a loan is backed with a used car (4 years old). "Short" and "Long" indicate the duration of loans: 3 years and 5 years respectively.