Spending today or spending tomorrow? The role of inflation expectations on consumer behaviour

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Research question

Research question

- Are current consumer expenditure and willingness to spend, especially on durables, related to household inflation expectations?

So far…

- no consensus has been reached in the literature.
- Positive association for Germany and Japan, mixed results for the US, negative for The Netherlands

According to the theory the sign of the relation is ambiguous…

- Positive sign:
  - $r = i - \pi^e$. Higher inflation expectations stimulate consumption (Euler equation; inter-temporal substitution effect).
  - Higher inflation expectations also imply mean expected wealth gains for debtors. If borrowers have higher MPC, higher inflation leads to higher spending.
- Negative sign:
  - higher π^e lower $(\frac{W}{P})^e$; negative impacts on spending (income effect).
  - π is a tax on the holders of highly liquid assets and if these assets are used as a medium of exchange π may function as a tax on economic activity.
  - higher π^e may lead to higher uncertainty and hence reduce consumption (precautionary-saving).

… and is thus a matter of empirical research

Related literature and our contribution

The literature: mixed evidence

- Burke&Ozdagli (2013) [US, panel at monthly frequency, quantitative C on both durables and non-durables and quantitative π^e, point and density]: small effects, negative and statistically insignificant. [+] only for car purchases.
- Bachmann&Berg&Sims (2015) [US, repeated cross-sections at monthly frequency, quantitative π^e, qualitative C^e on durables]: small and statistically insignificant effect outside the ZLB, and significantly negative at the ZLB.
- Ichiue&Nishiguchi (2015) [Japan, repeated cross-sections at quarterly frequency, qualitative C, C^e and π^e]: households that expect higher inflation plan to decrease their future spending but have increased their spending in the past.
- Ito&Kaihatsu (2016) [Japan, age-stratified panel, qualitative C, C^e, π^e and w^e]: a rise in inflation expectation stimulates consumption.

The literature: mixed evidence

- D'Acunto&Hoang&Weber (2015) [Germany, repeated cross-sections at monthly frequency, qualitative C^e on durables and π^e]: causal relationship (IV approach exploiting change in VAT); positive impact on willingness to spend.
- D'Acunto, Malmandier, Ospina and Weber (2018) and D'Acunto, Hoang and Weber (2018), relying on Nielsen homescan panel of US households and upon Finnish data, respectively, show that π^e stimulates C.
- Arioli et al. (2017) [EU Consumer survey] document that households in the euro area behave in line with the Euler equation. Duca, Kenny, and Reuter (2018) exploit the same dataset and reach similar conclusions for the euro area as a whole and for most of the member countries.
- Coibion, Georgarakos, Gorodnichenko and van Rooij (2019) [Dutch data; quantitative C and C^e for durables and non-durables; quantitative and point estimate for π^e] find that the causal effect of π^e on non-durable spending is imprecisely estimated, but there is a sharp negative effect on spending on durables.

Our contribution

- We look at the relationship between the willingness to spend (and current consumer expenditure), especially on durables, and household inflation expectations for the **Italian economy**.
- We exploit **quantitative** measures of both consumer expenditure and inflation expectations at the individual level; both **point and density forecasts on inflation expectations are available**.
- We assess the willingness to spend at **shorter** and **longer** time horizons.
- We could compare the impact of inflation expectations on expenditure at the **zero lower bound** and **outside**.
- We also control for **income expectations** (quantitative measure)…
- …as well as for quantitative measures of wealth (financial and real) and income and for several socio-demographic variables thus estimating a proper consumption function

Preview of the results

- In a high inflation regime consumers tend to anticipate spending as higher inflation expectations lead to lower real interest rates if nominal rates are fixed, supporting the working of an intertemporal substitution mechanism.

- In the most recent period as higher expected inflation translates into a loss in purchasing power readiness to buy durables tends to react negatively, thus in line with the income effect argument.

- The channels related to wealth are at work in both regimes as spending decisions change depending on the composition of household balance sheets.

Data

Data: Consumption *and* C^e

- We use the Survey of Household Income and Wealth for 1989, 1991 and 2016.

- The SHIW collects information on actual total consumption in the reference year, with a breakdown into several expenditure items, such as food, other non-durables excluding food, durables (distinguishing between cars and other durables excluding cars), and housing.

- In 2016 households that owned at least one car were asked the following questions:

  A1. How long has your household owned the car (if more than one car, refer to the car used most often)?
  A2. How many km does the car have on the clock (the car used most often)?
  A3. How likely is it (from 0 to 100) that your household will buy a new car to replace the present one (the car used most often)?"
  before the end of 2017
  in 2018
  in 2019

More

Data: Inflation

In 1989 and in 1991 household heads were asked:

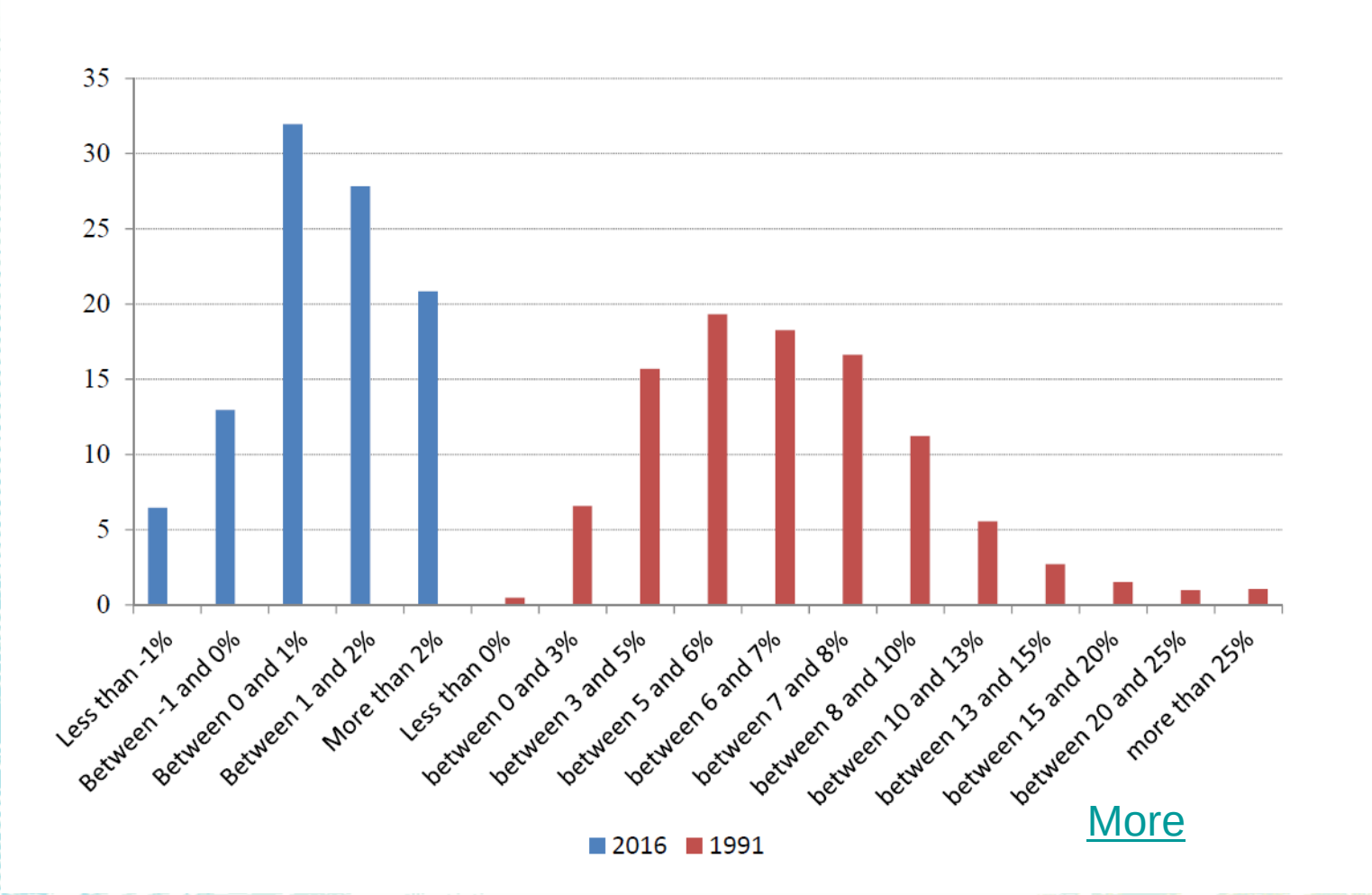
B1. Below you find some intervals for inflation. We would like to know your opinion about inflation in Italy one year head. Distribute 100 points among the following alternatives
[more than 25%]/[between 20 and 25%]/[between 15 and 20%]/[between 13 and 15%]/[between 10 and 13%]/[between 8 and 10%]/[between 7 and 8%]/[between 6 and 7%]/[between 5 and 6%]/[between 3 and 5%]/[between 0 and 3%]/[less than 0%].

In 2016:

B2. We would now know your opinion about future inflation. Distribute 100 points among the following alternatives: give a high score to those considered most likely and a low to less likely. In the average of 2016, consumer inflation, measured by the year-on-year rate of change of the Harmonized Index of Consumer Prices, was equal to -0.1 per cent in Italy. What do you expect to be the average inflation in Italy in next 12 months

(distribute 100 points) *[more than 2%]/[between 1 and 2%]/[between 0 and 1%]/[between -1% and 0%]/[less than -1%].*

Frequency distribution of π^e



- Expectations surveyed in the SHIW **anticipate fairly well** the official data.

Methodology

Methodology

- Households formulate their inflation expectations at time *t* and use these expectations to decide whether spending at time t+1.

- The SHIW collects information on consumption (and its components) in the reference year, i.e. as for the 2016 wave households are asked in the first part of 2017 to report their expenditure in the previous year and their inflation expectations one-year ahead.

- For the period of high inflation we estimate both cross-section and fixed-effects estimates:

$$C_{it} = \beta_0 + \beta_1 \pi^e_{i,t-1} + \beta_2 \sigma^e_{i,t-1} + \beta_3 X_{it} + \theta_t + \epsilon_{it}$$

and

Timing

$$C_{it} = \beta_0 + \beta_1 \pi^e_{i,t-1} + \beta_2 \sigma^e_{i,t-1} + \beta_3 X_{it} + \theta_i + \epsilon_{it}$$

where ${\pi^e}_{i,t-1}$ is the inflation expectation of household *i* formulated in the previous wave (1989 and 1991) and ${\sigma^e}_{i,t-1}$ is a measure of individual dispersion of these expectations.

Methodology

- In the low inflation period we cannot use the panel component as inflation expectations are formulated in 2017 over a 12-month horizon, we estimate:

$$C^e_{it} = \beta_0 + \beta_1 \pi^e_{i,2016} + \beta_2 \sigma^e_{i,2016} + \beta_3 X_{i,2016} + \epsilon_{it}$$

Where $C^e{}_{i,t}$ is the expected probability of household *i* of purchasing a car in year *t*, with *t=2018 and 2019*.

- Our identification improves upon Bachmann et al. (2015) and Ichiue and Nishiguchi (2015) which rely on the variation in behavior across households only, as for the early Nineties we can exploit variation within households over time...
- …but we cannot extend this identification strategy for a longer period as done in Burke and Ozdagli (2013) and we cannot rely on an exogenous source of variation for inflation expectations (as in D'Acunto et al. 2018 and Coibion et al. 2019).

What's behind inflation expectations

- In both low and high inflation times cross-sectional variation is weakly correlated with observables (as in Kaplan and Schulhofer Wohl, 2017) and most of the effect is captured by the constant (about 1% in 1991 and 7.3% in 2016):
  - The level of **financial literacy** does not help to explain the tendencies in inflation expectations.
  - No age effect in 2016, while in 1991 expected inflation decreases with age,
  - **Education** and **sex** affect π^e during high inflation times only: more educated households on average expect higher inflation; on average male have higher expectations compared to women.
  - In 2016 the variable accounting for the **difficulty in making ends meets** plays instead a major role: households whose head can easily making ends meets have lower inflation expectations compared to those struggling to make ends meet; consistently, most affluent households have lower inflation expectations, as suggested by the coefficients for income and wealth.
  - People living in the **South** expect higher inflation, but this effect vanishes when we control for household economic conditions.

Results

Results: high inflation regime

	Total	food	non dur.	durables	*of which*		rents	imputed rents
					cars	oth. dur.		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
π^e	79.66**	10.12	20.67	89.46	27.59	34.53	14.22	21.14
	[37.91]	[13.86]	[20.48]	[61.69]	[96.35]	[34.76]	[15.50]	[19.81]
σ_{π^e}	234.3	47.07	280.4***	-227.5	130.4	-96.85	78.6	160.4*
	[164.4]	[60.10]	[88.81]	[267.7]	[469.5]	[141.6]	[63.37]	[85.24]
y	0.255***	0.0571***	0.111***	0.0685***	0.0919***	0.0276***	0.00361	0.0506***
	[0.00818]	[0.00299]	[0.00442]	[0.0118]	[0.0189]	[0.00624]	[0.00374]	[0.00388]
w	0.00130**	-0.00102***	-0.000872***	0.00215**	0.00244*	0.000663	0.000182	0.00172***
	[0.000569]	[0.000208]	[0.000307]	[0.000907]	[0.00142]	[0.000493]	[0.000375]	[0.000257]
Const.	6743***	1170***	2613***	8284***	14734***	2786***	1142***	1896***
	[929.3]	[339.7]	[502.0]	[1523]	[2411]	[852.3]	[351.4]	[512.5]
Obs.	4540	4538	4537	1549	669	1120	1492	2909
R^2	0.531	0.401	0.36	0.113	0.155	0.075	0.099	0.329
demo	YES	YES	YES	YES	YES	YES	YES	YES
year	YES	YES	YES	YES	YES	YES	YES	YES

Notes: OLS estimates for 1991 and 1993. Sample weights included. Demographics include: sex, age, education, number of components, geographical area. $^{***}p < 0.01, ^{**}p < 0.05, ^{*}p < 0.1$.

Results for durables: high inflation regime

	durables	cars	other durables
	(1)	(2)	(3)
π^e	0.00239	0.00303*	-0.00166
	[0.00288]	[0.00179]	[0.00274]
σ_{π^e}	-0.0115	-0.012	0.00412
	[0.0120]	[0.00760]	[0.0106]
Obs.	4540	4540	4540
demo	YES	YES	YES
Y and W	YES	YES	YES
year	YES	YES	YES
Obs. prob	0.334	0.145	0.239

Notes: Probit estimates for 1991 and 1993; marginal effects. Sample weights included. Demographics include: sex, age, education, number of components, geographical area. $^{***}p < 0.01, ^{**}p < 0.05, ^{*}p < 0.1$.

Results: high inflation regime

- The estimates provide support for the hypothesis that higher inflation expectations stimulate current consumption (**intertemporal substitution effect**).
- The absence of a relevant income effect is not surprising against the back-ground of the automatic **wage-indexation mechanism** ("scala mobile") that was in place at that time and later abolished in July 1993.
- The positive response of consumption to higher inflation forecasts is by and large driven by households with **youngest heads.** Households expecting a higher inflation by one percentage point are more likely to purchase a car by 0.007 percentage points (average probability of 0.19).
- The positive impact of inflation expectations on total annual consumption is equal to 73 euros if the household is not indebted, but jumps to more than **300 euros for those indebted.**
- Households less endowed with financial activity show a higher and significant effect (86 euros) **[inflation is a tax on asset holders]**

Results: low inflation regime

	in 2018	in 2019	in 2018	in 2019	in 2018	in 2019
	(1)	(2)	(3)	(4)	(5)	(6)
			MEAN			
π^e	-1.158***	-1.624***	-1.158***	-1.624***	-0.803**	-1.200**
	[0.379]	[0.487]	[0.379]	[0.487]	[0.372]	[0.481]
σ_{π^e}	0.543	0.148	0.531	0.141	0.927*	0.634
	[0.572]	[0.735]	[0.571]	[0.735]	[0.561]	[0.725]
fin low	0.810	-2.343**	0.746	-2.385**	0.792	-2.317**
	[0.844]	[1.085]	[0.843]	[1.085]	[0.826]	[1.068]
Car: km					0.383***	0.492***
					[0.0515]	[0.0666]
Car: year					0.506***	0.485***
					[0.0699]	[0.0903]
Bought car (dummy)			-3.284***	-2.148*		
			[0.966]	[1.243]		
Constant	1.618	12.48***	1.749	12.57***	-6.368***	3.634
	[2.226]	[2.861]	[2.224]	[2.861]	[2.238]	[2.892]

Results: low inflation regime

- Intentions of purchasing a car respond negatively (or are non-responsive) to higher expected inflation (as in Coibion et al. 2019; stagflationary view).

- Preliminary evidence shows that the result
  - holds for both indebted and non-indebted households
  - is driven by non financially constrained households (not enough liquid saving to cover three months of non durable consumption and financial wealth lower than €6,000 – median-).

Concluding remarks

Conclusions

- An **intertemporal substitution** effect prevailed in the early Nineties, when current consumption tend to benefit, though modestly, from higher inflation:
  - Inflation as a tax on asset holders
  - Indebted households benefit from inflation

- The **income effect** plays the lion's share in the late 2010s, as the readiness to buy durables (cars) reacts negatively.

Discussion

- **ECB's mandate of price stability**

- **Differences in the bargaining system**.

All in all, our results are in line with the empirical evidence questioning the prominence of the intertemporal substitution effect in the standard representative agent models, and provide support to the growing literature considering heterogeneous agents.

Nesting our micro evidence in a macro theoretical heterogenous agent framework is in our view a promising avenue for future research.

Thanks for your attention!!!

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Data: Consumption *and* C^e

		1991			2016		
	Variable	Obs.	Mean	Std. dev.	Obs	Mean	Std. dev.
Annual Consumption	Total	8,188	23,606	13,254	7,421	22,118	14,620
(in Euro):	Food	8,188	8,375	4,109	7,421	6,299	3,961
	Non durables	8,188	8,636	6,210	7,421	9,022	8,483
	Durables	2,590	7,740	9,152	1,989	4,846	8,452
	Cars	1,140	11,898	9,143	527	11,839	10,889
	Other durables	1,859	3,417	5,471	1,657	1,777	3,786
	Rents	3,031	2,196	2,214	2,083	2,695	2,789
	Imputed Rents	4,867	5,617	4,364	5,338	6,683	4,648
Probability of buying	by 2017				5,326	7.4	20.6
a new car (over 100):	in 2018				5,326	9.9	21.7
	in 2019				5,326	16.3	27.8

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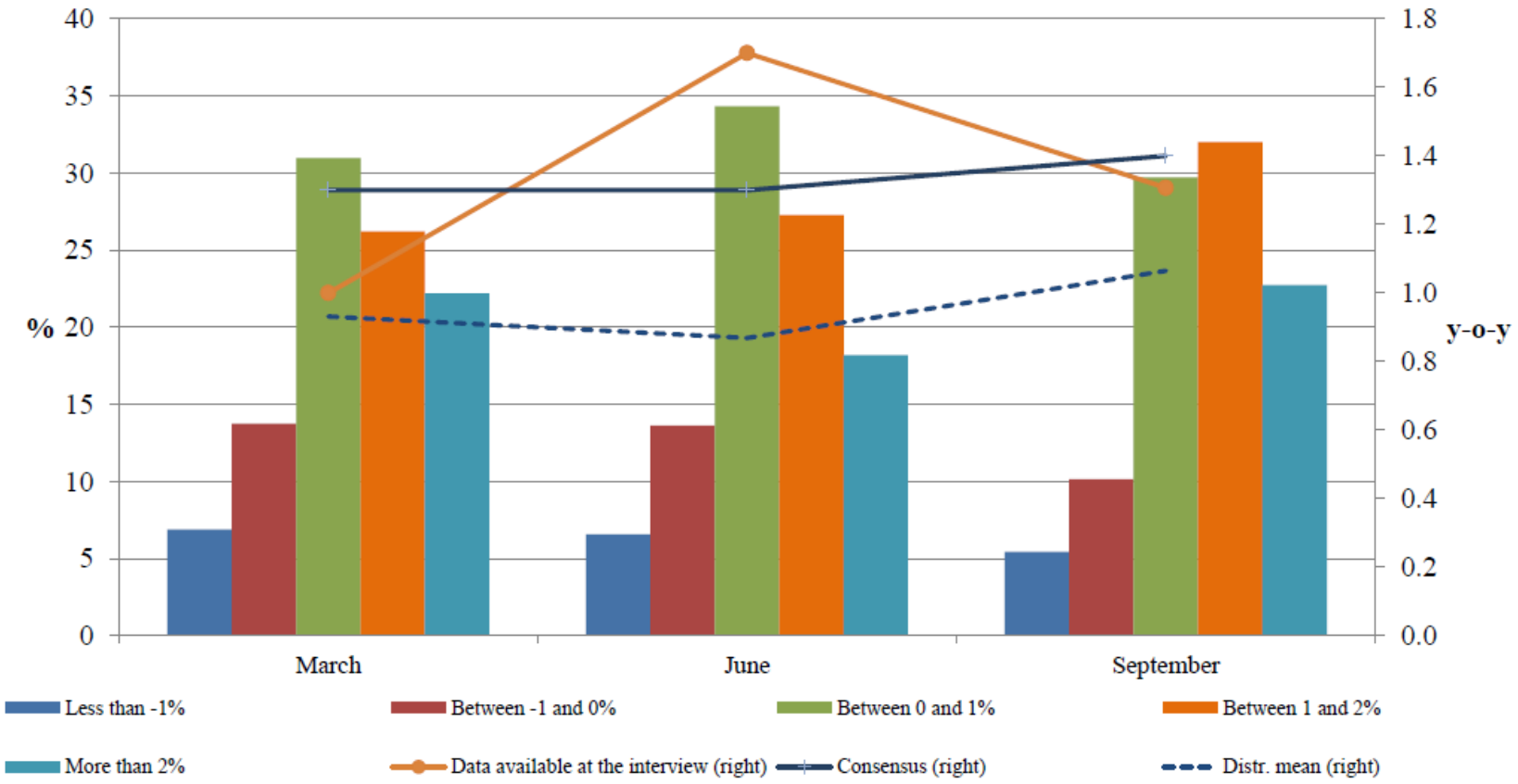
HICP and π^e from Consensus and SHIW



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Timing of C, C^e and π^e

1991 Wave

Interviews between January 1992 and August 1992:
households formulate their inflation expectations one year head

π expected for Jan-Aug. 1993 (X independent variable)

1993 Wave

Consumption in 1993 (Y dependent variable)

2016 Wave

Interviews between January 2017 and October 2017:
households formulate their inflation expectations one year head;
households formulate their intentions to buy a car in 2018 and 2019

π expected for Jan-Oct. 2018 (X independent variable)

Intentions to buy a car in 2018 and 2019 (Y dependent variable)