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Title: Hyperinflation Expectations: an Experimental Study

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Hyperinflation Expectations: An Experimental Study*

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Abstract

Consumers' perceptions of current inflation play a key role in understanding household consumption and investment decisions as well as the impact of monetary policies. Evidence from countries with low or moderate inflation shows that people's perception of inflation often diverges significantly and systematically from official inflation rates. We examine the relationship between actual and perceived inflation in a hyperinflation environment. Our experimental results show that, opposite to low inflation, hyperinflation is greatly underestimated in people's perceptions. Moreover the accuracy of inflation perceptions, as inflation rises, exhibits an inverse-U shape, which confirms our novel, preregistered "perception accuracy inversion hypothesis".

Keywords: *Inflation; Hyperinflation; Expectations.*
JEL Classification: E7, C9

1 Introduction

Perceptions of inflation play an important role in economic theory and policymaking. More specifically, consumer inflation perceptions are key to understanding household consumption and investment decisions as well as the impact of monetary policies. Central banks around the world aim to manage inflation and traditionally have operated under the assumption that people perceive the official inflation rate as the actual and relevant one for their decision-making. More recently though, the effectiveness of monetary policy is increasingly seen to be heavily dependent on the perceived inflation rate, rather than the actual inflation rate (Bernanke et al., 2007; Blanchard et al., 2010).

Observational and experimental evidence in environments of low and intermediate inflation has led to several stylised facts regarding the relationship between perceived

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and actual inflation. First, the evidence indicates that the perceived rate is not necessarily consistent with the actual rate (Curtin, 2019), but it can sometimes deviate systematically and to a considerable degree (Georganas et al., 2014). Second, households' inflation expectations are generally upward biased compared to the central banks' inflation rates (D'Acunto et al., 2023; Fluch et al., 2005). Thirdly, researchers such as Georganas et al. (2014) and D'Acunto et al. (2021a) find that inflation perceptions are driven by individual consumption experiences. Moreover, people fall for 'frequency bias' when forming inflation perceptions; that is, consumers tend to overweight the price changes of frequently purchased goods when forming economy-wide inflation perceptions resulting in departures away from the actual inflation in the economy.[1] Finally, price increases are perceived more strongly than price reductions in informing inflation perceptions (Fluch et al., 2005; D'Acunto et al., 2021a).

The literature has been increasingly employing behavioural economics models to account for the divergence between actual and perceived inflation. Prospect theory is a prominent such model (Fluch et al., 2005), especially in accounting for the disproportionate influence of price increases (losses) relative to price decreases (gains). In addition, models of limited attention – for a review see Gabaix (2019) – have been applied by theoretical and empirical researchers. The idea is that factors that determine attention to inflation also drive inflation perceptions and its accuracy. Bracha and Tang (2024) make the 'Attention-Inflation Hypothesis' that attention is monotonically increasing in the level of inflation, and provide empirical evidence for it. Similarly, in Cavallo et al. (2017), the authors showed that, in accordance with the rational inattention model, individuals in a moderate inflation context (around 22%) have strong beliefs about inflation, since the financial cost of misperceiving inflation is high. Thus, being in an environment where there are higher stakes at risk, agents become prompted to seek high quality information, and do so more frequently, resulting in expectations being closer to the actual inflation levels (Mankiw et al., 2003; Carroll, 2003).[2]

However, research in the context of hyperinflation is missing, presumably because

[1] Meanwhile, central banks focus mostly on core inflation that does not include price changes of groceries, due to the fact that these changes are volatile. This results in aggravating the divergence of consumers' expectations away from the actual inflation statistics (D'Acunto et al., 2023; D'Acunto et al., 2021b).

[2] Rebelo, Santana, and Teles (2024) employ a behavioural model where consumers employ intuitive system 1 or deliberate system 2 to make their consumption decisions. When prices change, they are more likely to engage system 2, which results to re-optimization of their decisions.

these environments are rare in the Global North. Interestingly, there is not a general agreement on the definition of hyperinflation, resulting in diverse criteria for applying this concept. According to the classic contribution of Cagan (1956), hyperinflation is the period in which the price level increases at least by 50% per month and ends when it drops below 50% and stays there by at least one year. On the other hand, Fischer et al. (2002) define a very high inflation episode when the twelve-month inflation rate increases above 100%. Reinhart and Rogoff (2011) use a threshold of an annual rate of 500%. Moreover, the International Accounting Standards Board states that hyperinflation occurs when a rate of 100 percent is recorded for three consecutive years.

Over the past few years, several countries have been considered hyperinflationary, such as Venezuela, Zimbabwe, Lebanon, Turkey, among others – as seen in Table 1. For example, Lebanon was hyperinflationary in March 2024, since the three-year and twelve-month cumulative rates of inflation were 1,810% and 70%, respectively. Since hyperinflation definitions differ depending on each study's purposes, we shall employ a different operational definition of hyperinflation. Given the fact that western central banks typically have inflation targets of 2% and they aggressively act to reduce inflation rates as low as 10%, in this paper we shall refer to environments of inflation greater than 50% annually – which unambiguously distort economic activity – as hyperinflationary.

Do consumers perceive inflation in a similar manner in hyperinflation environments as in settings of low and intermediate inflation? Moreover, do the behavioral determinants that have been studied in low and intermediate inflation environments apply in hyperinflation environments? In other words, we are interested in the scope conditions of these behavioral models. Our objective in this paper is to study how the formation of inflation perceptions differs in a hyperinflation environment, relative to low or moderate inflation environments.

We start from the following preregistered hypothesis, which we refer to as ***'Perception Accuracy Inversion'***: as long as the driver of inflation expectations is everyday consumption experience,[3] we expect an inverse-U shape in the quality of perceptions. The quality of perceptions is measured as the percentage deviation of perceived inflation from official inflation. The mechanism behind this prediction is the following. Because of higher

[3]In environments of hyperinflation, it seems even more likely that consumers disbelieve official statistics, turning to personal experience in forming their inflation expectations.

Country	Annual Inflation Rate 2022	Annual Inflation Rate 2023	Annual Inflation Rate 2024
Middle East			
Lebanon	171.2 %	221.3 %	45.24 %
Turkey	72.3 %	53.9 %	60.9 %
Jordan	4.23 %	2.08 %	2.1 %
Africa			
Egypt	21.269 %	24.4 %	33.3 %
Ethiopia	33.9 %	30.2 %	23.9 %
Zimbabwe	193.4 %	667.4 %	635.3 %
Europe			
United Kingdom	9.1 %	7.3%	2.5 %
Cyprus	8.1 %	3.9 %	2.3 %
Greece	9.3 %	4.2 %	3.0 %
Italy	8.7 %	5.9%	1.1 %
Spain	8.3 %	3.4 %	2.9 %
France	5.9 %	5.7 %	2.3 %
Germany	8.7 %	6.0 %	2.5 %
North America			
United States	8.0%	4.1 %	3.0 %
Canada	6.3 %	3.4 %	2.4 %
Mexico	7.91 %	4.88 %	4.7 %
South America			
Argentina	72.4 %	133.5 %	229.8 %
Venezuela	186.5 %	337.5 %	59.6 %
Brazil	9.3 %	4.6 %	4.3 %

Table 1: Inflation Rates Across a Range of Countries (International Monetary Fund, 2025)

incentives to pay attention, inflation perceptions should improve as we move from low to intermediate inflation. However, with hyperinflation, continual and large price changes make it more difficult to calibrate inflation, even when attention is increased. This is driven by cognitive costs.[4] We conduct a novel preregistered lab experiment with a dual objective: 1) to generate novel evidence in the understudied environment of hyperinflation 2) to test our hypothesis by examining the quality of calibration of inflation expectations in a hyperinflation environment compared to low and intermediate levels.

The lab experiment results showed that the absolute value of the average percentage deviation decreases as we move from low (4%) to intermediate (25%) inflation levels – the values decline from $347.61\,\%$ to $25.37\,\%$. However, absolute percentage deviation increases again from $25.37\,\%$ to $57.68\,\%$ as we move from intermediate to hyperinflation (75%) environments. This indicates that quality of calibration of expectations/perceptions improves from low to intermediate, presumably because attention rises with inflation. However,

[4]This is an idea going back to Herbert Simon (Rosser Jr, 2021). Carlin (2009) employ a model where more complex market structures for financial products result in a fraction of consumers choosing to remain uninformed about prices. The greater complexity of the inflation calibration problem at hyperinflation environments also stems from the higher volatility of inflation, a point that will be discussed below.

the calibration quality declines between intermediate and hyperinflation, thus supporting our ***Perception Accuracy Inversion*** hypothesis. We also find that, even with the large difference in actual rates, average expectations tend to be similar across our three inflation conditions (around 15 %-30% in all 3 conditions). Moreover, we observe strong underestimation of inflation in the hyperinflation environment. In addition, many participants exhibit inconsistent behavior: they attribute a higher overall inflation rate for the whole basket than for the weighted average of the individual inflation rates.

Our experimental setup is based on Georganas et al. (2014), who focused on examining the frequency bias in inflation perceptions. Their results confirmed that this bias plays an important role. In our study we consider low, intermediate and high inflation settings. Our focus is on the cognitive and information-processing aspects of consumption experiences and the differences of these aspects across the three settings. Ours is the first comparative study across the three inflation settings, indicating strong underestimation of inflation in hyperinflation environments. Our second contribution lies in our ***Perception Accuracy Inversion*** hypothesis, which we posit and test in the laboratory, where we find supporting evidence.

The rest of the paper is organized as follows: in section 2, we introduce our design and the accompanying hypotheses. In section 3 we present the experimental results, while section 4 concludes.

2 Experimental Design and Accompanying Hypotheses

Our lab experiment, inspired by the design of Georganas et al. (2014), is intended to measure the perceived inflation rates in a simulated economy. Participants make repeated simulated consumption choices[5] and are then asked for the rate of price increase across two periods. Our main manipulation is that we compare a baseline treatment with low inflation (Treatment LOW) to a treatment with intermediate inflation (Treatment INTERMEDIATE) and one with hyperinflation (Treatment HIGH). We are primarily interested in the 'perception error' capturing the quality of inflation perceptions. Perception error is the

[5]The task participants faced is selecting the lowest price (across stores) for each good, for a bundle of goods. This setting is simplified, ruling out substitution among goods. Given the fact that we targeted a large number of periods, providing subjects with a budget and letting them choose would be rather impractical. This alternative setting should be considered in future research examining the robustness of our findings.

percentage gap between reported perceptions of inflation and actual inflation.

How does perception error depend on the level of inflation? To form rigorous hypotheses, we present a simplified model of cognitive costs and attention.[6] In this model, the accuracy of inflation perceptions will be a general function of attention and complexity of the problem that the decision-maker is facing.

Let us first assume that attention a is a positive function of inflation rate π:

$$a = f(\pi)$$

Complexity c is also a positive function of inflation rate π:

$$c = g(\pi)$$

The functions f and g are increasing and continuously differentiable. We assume that while f is concave,[7] the complexity function g is convex.[8] The interpretation of these modeling assumptions is that the attention consumers devote to the problem of inflation calibration is a positive function of the monetary stakes associated with the problem. As the inflation rate rises, the higher the effects of inflation on consumers' wealth, and hence the incentives for consumers to allocate more attention in getting the inflation rate right.[9] In addition, as long as consumers are based on everyday consumption experiences to form their inflation perceptions, rapid price changes make the inflation calibration problem more complex and difficult to solve. Figure 1 presents the positive relationship between inflation and attention/complexity, as well as illustrates our functional form assumptions.

Accuracy of inflation expectations $z(a, c)$ is a function of both attention and complexity,

[6] Our simple model is in the spirit of attention models with endogenous constraints on perception (see discussion in Caplin, Martin, Marx, Morozova, and Xu (2025)), unlike models with fixed bounds on attention. For more related theoretical and experimental work, see Caplin and Dean (2015) and Gabaix et al. (2003).

[7] The assumption of increasing but concave attention, as a function of incentives, follows from a standard underlying assumption of convex costs of attention, such as in the recent work of Bronchetti, Kessler, Magenheim, Taubinsky, and Zwick (2023).

[8] This corresponds to the concept that the increase in complexity of an environment is accelerating as the dimensions of the environment grow.

[9] There is evidence for this. Cavallo et al. (2017) conducted online and offline surveys and randomly provided subjects with information, such as inflation statistics and tables with historical prices. The survey experiments were conducted in two contexts: low inflation (USA) and intermediate inflation (Argentina). Individuals in the low inflation context had weaker priors about the inflation rate compared to those in the moderate inflation context. Thus, results indicated that attention levels increase as we move from low to intermediate levels of inflation. Moreover, Weber et al. (2025) showed that as inflation increases to high levels (at most 8%), households and firms become become less responsive to information treatments about inflation, due to an increase in their degree of attention in the absence of treatment.

such that accuracy increases with attention, but falls with the complexity of the problem:

$$\frac{dz}{da} > 0\,,\ \frac{dz}{dc} < 0$$

Accordingly, z is a composite function of inflation rate π. Given our assumptions about the attention and complexity functions, accuracy of expectations attains a unique maximum as a function of inflation. Accordingly, there is an inflection point π^*, after which accuracy begins to decline. The derivative of the accuracy function with respect to π is the following:

$$\frac{dz(f(\pi), g(\pi))}{d\pi} = \frac{dz}{df}\frac{df}{d\pi} + \frac{dz}{dg}\frac{dg}{d\pi}$$

Thus, the derivative is positive until the inflection point π^*, which satisfies the following equation:

$$\frac{dz}{df}\frac{df}{d\pi} = -\frac{dz}{dg}\frac{dg}{d\pi}$$

Intuitively, as inflation surpasses a certain level, the effect of increasing complexity dominates the effect of increased attention, as illustrated in Figure 1. Below we summarize our main predictions, which express the ***perception accuracy inversion*** hypothesis:

> **Prediction 1:** The accuracy of inflation perceptions is higher in Treatment INTERMEDIATE relative to Treatment LOW.
>
> **Prediction 2:** The accuracy of inflation perceptions is lower in Treatment HIGH relative to Treatment INTERMEDIATE.

Empirically, this says that the 'perception error' will initially decrease as inflation rises and then increase as inflation continues to rise. The interpretation is that, according to our model, as we move from low (4%) to intermediate (25%) inflation, we have not reached the inflection point yet, so that accuracy z will increase. On the other hand, as we move from intermediate to high inflation (75%), we shall hit the inflection point, and therefore z will decrease.[10]

[10] Our simple model helps us focus ideas and guide our generation of initial evidence in favor of the perception accuracy inversion hypothesis. The next step in future research is to consider a fully-fledged model that explicitly derives the location of the inflection point.

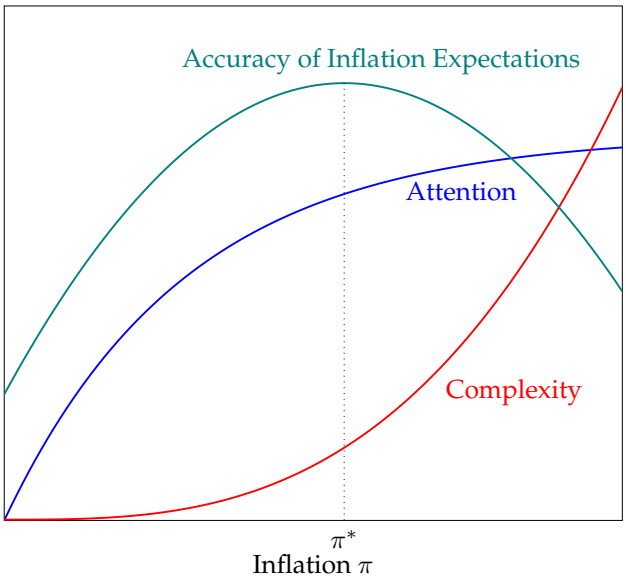

Figure 1: Relationship of complexity, attention, and accuracy of inflation expectations with inflation.

2.1 Implementation of the Experiment

The experiment was designed using the oTree platform and was preregistered in the Open Science Framework (Chen et al., 2016). The experimental sessions were conducted in March 2024 at the University of Cyprus (UCY) experimental economics laboratory. All subjects were UCY students (almost all undergraduates) recruited via email through the ORSEE platform (Greiner, 2004). The target sample was 150 participants, a sample comparable to previous studies. The UCY student population disproportionately includes females, as well as young and highly educated people and those with moderate-to-high income.

	Males	Females	Household Income $<$ €30k	Household Income between €30k -50k	Household Income between €51k -100k	Household Income $>$ €100k	At least one parent has **Tertiary education**	Total
Low Inflation	13	33	17	12	9	1	26	46
Intermediate Inflation	17	28	20	6	5	1	32	46
Hyperinflation	19	34	18	12	8	1	37	54

Table 2: Demographics

After reading the instructions, participants proceeded to make a series of computer-based decisions. Once every subject completed the experiment, they were paid in cash, privately, based on their earnings. Earnings during the experiment were recorded as 'points', with 100 points being worth €0.7. Final earnings could range between €5 to €15, including

a €5 participation fee.

The experiment consisted of two phases. The first phase was divided into 96 periods which are referred to as '$days$'. One '$month$' consisted of sixteen '$days$', for a total of six months in the first phase. In each day, subjects were shown a 4×3 table of prices. Figure 2 shows an example of such a table that participants observed. Each row corresponds to a different type of good, and goods are labeled A, B, C, and D. Each column corresponds to a different brand, labeled as 1, 2, and 3. In each 'day' subjects were told which type of good they were to purchase $(A, B, C$ or$D)$ and were asked to select the cheapest price for that good. They could then click on any of the goods and prices shown in the table. If they chose the lowest price of the correct good, then five points were earned. Choosing the middle price of the correct good would earn them three points, while if they chose the highest-priced good, they earned one point. However, they earned zero points if they chose an incorrect good. After clicking at a price, the experiment proceeded to the next 'day', where a new table of twelve prices was shown and subjects were again told which good to buy. If a subject did not choose any price within 30 seconds, they earned zero points for that 'day' and the experiment automatically proceeded to the next round. On the first 'day', no time limit was imposed.

Over the 96 days, subjects shopped for the different goods with different frequencies. Specifically, in each 16-day month, they were requested to purchase good A seven times, good B six times, good C two times, and good D one time; you can see Table 3 for details. We refer to each month's bundle of purchases as a "$basket$", and we randomized the ordering of the purchases in a given basket within each month. Moreover, the simulated shopping experience was designed to imitate key aspects of actual consumer purchases. When shopping for an item, consumers usually focus only on a single type of good, even though the prices of other goods are also available for browsing. In addition, some items, such as gasoline and food, are purchased more frequently than others.

No notion of quality was introduced, so that prices do not need to be adjusted for varying quality levels. Several prices for the desired good are offered – which adds noise to inflation perceptions – and consumers benefit by choosing the lowest-priced choice. Purchases were rewarded using a fixed point system, rather than giving shoppers a total budget. This was chosen not only because of practical time constraints, but also because

recalling basket inflation rates with a fixed budget would be equivalent to observing the total price change in the budget. This would render the environment somewhat unnatural for examining inflation perceptions stemming from *consumption experiences*.

For the first month, as can be observed in the third row of Table 3, each of the four goods $i \in \{A, B, C, D\}$ was given an initial mean price $\bar{p}_{i,1}$. During the initial month, no price change occurred (on the average). Price changes begun in month 2. At the beginning of each subsequent month, the mean price for each good jumped by a fixed monthly inflation rate $(1 + r) = (1 + \pi_i{}^*)^{\frac{1}{5}}$, such that $\pi_i{}^*$ is the overall inflation rate over the 6 months of the economy for the basket and each of the goods, and r is the fixed monthly inflation rate. The above formula is based on the compounded change in price over the six months. The overall inflation rate at the end of the sixth month was in expectation equal to the target level given in Table 3.

In Treatment LOW, the simulated economy is a low-inflation environment, so the basket and each of the four goods have a target inflation rate over the 6 months of $\pi_i{}^* = 0.04$. In Treatment INTERMEDIATE, the simulated economy is an intermediate-inflation environment, so the basket of goods and each of the four goods have a target inflation rate over the 6 months of $\pi_i{}^* = 0.25$. In Treatment HIGH, the simulated economy is a hyperinflation environment, so the basket and each of the four goods have a target inflation rate of $\pi_i{}^* = 0.75$; see Table 3. Although inflation occurs from month to month, the mean price does not change within the month. Therefore, for any day t in month m the mean price of a good i is $\bar{p}_{i,m}$, and in every day of month $m + 1$ the mean price of good i is $\bar{p}_{i,m+1} = \bar{p}_{i,m}(1 + r)$.

Moreover, the three daily prices for each good offered to the participants each day were uniform random draws centered at the current month's mean price. In each day t of month m, the realized price of brand $b \in \{1, 2, 3\}$ is a value $p_{i,m}^{b,t}$ drawn from a uniform distribution over the interval $[0.9\bar{p}_{i,m}, 1.1\bar{p}_{i,m}]$. The daily price of each brand was independently drawn from all other prices, conditional on the mean price of the given good for the month. All twelve prices, which consist of the three brands of four goods, were shown in a 4x3 table, where subjects can easily view the prices for all goods each day. Figure 2 presents an example of the actual table that subjects observed during the experiment.

Let $\iota(m, t) \in \{1, 2, 3, 4\}$ denote the good that a subject is asked to buy on day t of month

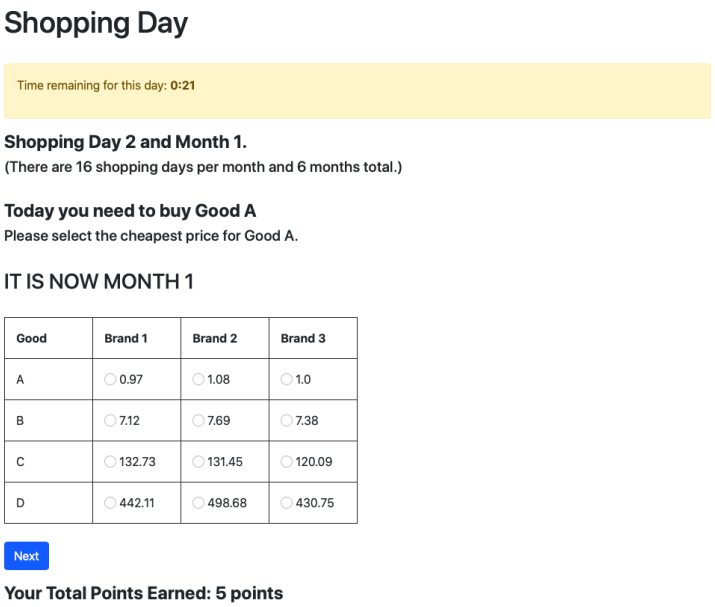

Figure 2: Phase I of the experiment: The shopping decision.

Good	A	B	C	D	Basket
Purchases per month	7	6	2	1	16
Month 1 mean price	€1	€7	€122	€470	€763
Target total inflation rate over 6 months:					
Treatment LOW	4%	4%	4%	4%	4%
Treatment INTERMEDIATE	25%	25%	25%	25%	25%
Treatment HIGH	75%	75%	75%	75%	75%

Table 3: Frequencies of purchases, starting prices, and target total inflation rates for the four goods used in the experiment.

m, and $p^t_{i,m} = \min\{p^{1,t}_{i,m}, p^{2,t}_{i,m}, p^{3,t}_{i,m}\}$ (the minimum price for good i on day t of month m). Then, the total expenditure on good i in month m is equal to:

$$P_{i,m} = \sum_{\{t:\iota(m,t)=i\}} p^t_{i,m}$$

The realized total basket price for month m is the total expenditure for the month $P_m = \sum_i P_{i,m}$. Then, over the six months, the realized inflation rate for the entire basket of goods is the following: $\Pi = \frac{P_6 - P_1}{P_1}$; whereas the realized inflation rate for good i is equivalent to the change in total expenditure on good i between the first and sixth month: $\pi_i = \frac{P_{i,6} - P_{i,1}}{P_{i,1}}$. It is important to note that actual, realized inflation rates (denoted π_i for each good and Π for the whole basket) might differ slightly from the underlying target inflation rates π^*_i presented in Table 3, because of the randomness in the actual price draws observed by the participants.

Phase one ends after all six months of shopping are completed, and this takes around twenty minutes. At no point of the first phase are subjects informed that they are purchasing an identical basket of goods every month, nor are they told that they will be asked inflation-related questions in the second phase. As for phase two, it consists of two decisions which are made consecutively: an estimate of the basket inflation rate, as well as an estimate of the inflation rate of each good.

Before the first decision was made in the second phase of the experiment, subjects were shown a new set of instructions, in which they were informed that they had been asked to buy an identical quantity of each good in each month, which had formed a 'basket' of goods. After that, they are asked: "What was the TOTAL percentage change of the price of a basket of goods from month 1 to month 6?" They were asked to enter their guess of the six-month basket inflation rate (denoted by Π^p) and of the six-month inflation rate for each of the four goods (denoted by π_i^p). After submitting their answers, they were informed about the actual inflation rate and received $425 - 500|\Pi^p - \Pi|$ points for their guess about the total inflation rate for the basket.[11] A subject with a perfect guess would earn €4.25, while a guess that is off by ten percentage points (where $|\Pi^p - \Pi| = 0.10$) earns €3.75. For each of the four guesses regarding the inflation rate for each of the goods (π_i^p), subjects are paid $125 - 500|\pi_i^p - \pi_i|$ points. Hence, having four perfect guesses would earn a subject €5.00. Note that all earnings were truncated at zero, so that no subject could earn negative payoffs for any of these decisions.

The payoff functions imply that, as the deviation between perceived inflation and actual inflation rises, the incentives to pay closer attention and improve accuracy grow. This is because larger deviations lead to greater expected potential losses, as presented in Figure 3. Therefore, attention levels during periods of intermediate inflation and hyperinflation are expected to exceed the levels exhibited during periods of low inflation. The reason is that even small percentage deviations in these treatments result in significantly higher monetary losses. For example, a 20 percent deviation leads to a loss of 20 points in the low inflation treatment, 125 points in the intermediate inflation treatment, and 375 points in the high inflation treatment. Therefore, the experiment effectively captures the model's

[11] This payoff function was chosen for consistency and comparability with Georganas et al. (2014). Several other studies also use a similar form for the payoff function, such as Assenza et al. (2014); Burke and Manz (2014) and Pfajfar and Žakelj (2018).

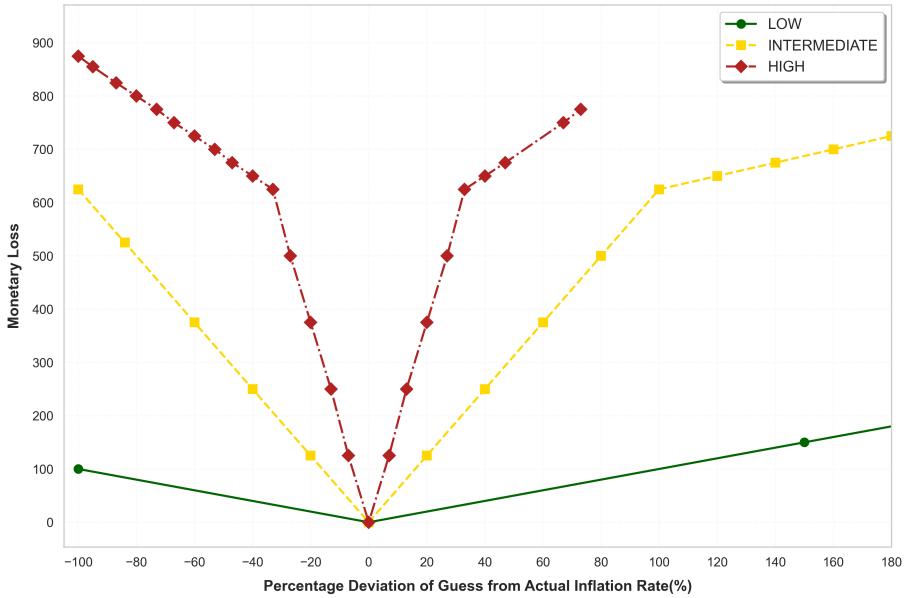

Figure 3: Accuracy of Inflation Perceptions vs Points Lost

assumption that stakes are increasing with respect to inflation levels.[12]

At the end of the experiment, subjects were shown their earnings in points from each decision, as well as the true inflation rates for the whole basket and for the four goods. Finally, subjects were paid their earnings in cash, signed a receipt and left.

3 Results

After running 11 sessions in the behavioral Lab at the University of Cyprus (UCY), we obtained our target of 150 participants. The Low, Intermediate, and Hyperinflation treatments included 47, 49, and 54 subjects, respectively. Before the analysis, we had to exclude four participants with invalid answers.[13]

The average time taken to finish the experiment, for all 3 treatments, was around 20-25 minutes. Average Payments, including the participation fee of €5, were €13.26, €11.62 and €9.62 for Low, Intermediate and High, respectively. Table 6 presents the actual inflation

[12] A subject with perfect guesses on all questions in Phase 2 would earn 925 points. In the **Low inflation** treatment, assuming a 20% deviation on all five questions (e.g. $\frac{(4.8\%-4\%)}{4\%} \times 100$), the total points earned would be 905, calculated as: $425 - 500|4.8 - 4| + (4 \times (125 - 500|4.8 - 4|))$. In the **Intermediate inflation** treatment, a 20% deviation (e.g. $\frac{(30-25)}{25} \times 100$) results in 800 points. In the **High inflation** treatment, a 20% deviation (e.g. $\frac{(90-75)}{75} \times 100$) results in only 550 points.

[13] One person from the Low Treatment was an outlier, recording extreme numbers, such as 1500 percent for their inflation expectations. Moreover, three participants from the Intermediate Treatment answered using decimal points, rather than percentages.

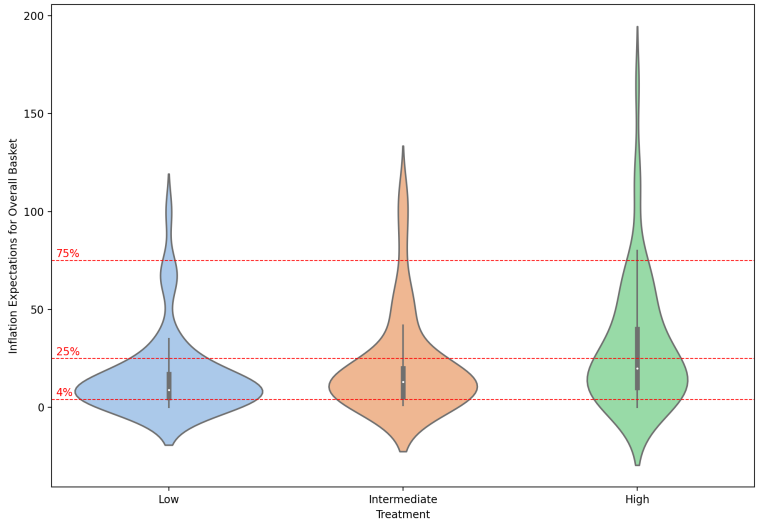

Figure 4: Distributions of inflation expectations for overall basket across the 3 treatments

rates for each good and for the whole basket for all three treatments: Low, Intermediate and Hyperinflation (High).[14] Figure 4 illustrates the distribution of subjects' inflation expectations across the 3 treatments.

Table 4 presents the average inflation expectations for the whole basket and for individual goods across the 3 treatments. The results indicate that even with the large difference in actual rates, we find similar expectations, as participants have average expectations in the range $15\% - 30\%$ in all 3 conditions. We examined the differences between the average inflation expectations across the three conditions using the Wilcoxon Rank-Sum test, a non-parametric test. Results indicate no significant difference (at the 5% level) between expectations in Treatment LOW and Treatment INTERMEDIATE, as well as between Treatment INTERMEDIATE and Treatment HIGH. We also observe a strong underestimation of inflation in Treatment HIGH. Additionally, the standard deviation of inflation expectations increases as inflation increases. Even though participants observed the same basket of goods and the same price changes in the experiment, there seems to be relatively large dispersion of expectations within treatment.

Table 5 presents the percentage deviations of expectations from realized 6-month inflation rates in the "economy". It presents the results for each treatment for the whole basket and for each good. These results show that the (absolute) average relative deviation decreases from $347.61\,\%$ to $25.37\,\%$ as we move from the Low to the Intermediate inflation

[14]Realized inflation rates in Table 6 differed slightly from the target inflation rates presented in Table 3 because of the randomness in the actual price draws observed by the participants.

	Average Expected Total Inflation	Average Expected Inflation (Good A)	Average Expected Inflation (Good B)	Average Expected Inflation (Good C)	Average Expected Inflation (Good D)	σ_{Π^p}
Treatment LOW	16.19	11.68	12.32	10.19	12.87	20.46
Treatment INTERMEDIATE	21.62	13.01	14.95	15.59	17.12	25.03
Treatment HIGH	31.47	29.81	23.81	21.56	30.83	32.49

Table 4: Average Expectations

	Average Percentage Deviation (Whole Basket)	Average Percentage Deviation (Good A)	Average Percentage Deviation (Good B)	Average Percentage Deviation (Good C)	Average Percentage Deviation (Good D)
Low Inflation	347.61	235.87	829.54	233.81	264.41
Intermediate Inflation	-25.37	-44.77	-40.70	-46.03	-40.44
Hyperinflation	-57.68	-60.44	-68.56	-70.38	-57.88

Table 5: Average Percentage Deviations from Actual Inflation rates

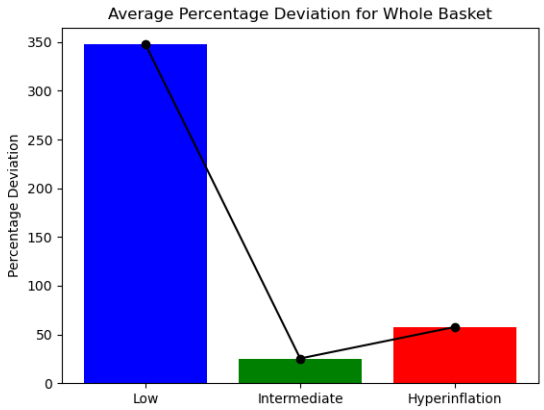

Figure 5: Absolute Value of Average Percentage Deviations across all 3 Treatments

environment. However, it increases again from $25.37\,\%$ to $57.68\,\%$, as we move from the Intermediate to the Hyperinflation environment. Figure 5 presents the quality of calibration of expectations for the whole basket, in terms of absolute percentage deviations (the pattern is similar for each individual good). This indicates that quality of calibration of expectations improves from low to intermediate, potentially because attention rises with inflation. However, the quality declines between Intermediate inflation and Hyperinflation, confirming both of our hypotheses.

Furthermore, many participants exhibit an important inconsistency. The basket inflation rate that they report is higher than the weighted average of the individual inflation rates. As we can see in Table 7, the average estimations of the basket inflation rate greatly exceed the corresponding weighted averages of individual goods inflation. The table also illustrates the fraction of inconsistent participants, as well as an interesting gender effect,

	Actual total Inflation (Whole Basket)	Actual total Inflation (Good A)	Actual total Inflation (Good B)	Actual total Inflation (Good C)	Actual total Inflation (Good D)
Low Inflation (Session 1)	3.2	3.3	7.3	2.9	3.0
Low Inflation (Session 2)	3.3	3.1	4.0	3.6	3.1
Low Inflation (Session 3)	3.7	2.9	0.4	2.3	4.7
Low Inflation (Session 4)	5.5	6.1	4.3	6.3	5.1
Intermediate Inflation (Session 1)	27.9	21.7	24.0	35.7	24.3
Intermediate Inflation (Session 2)	31.2	24.0	24.8	25.4	34.9
Intermediate Inflation (Session 3)	27.1	23.2	31.4	28.9	26.0
Intermediate Inflation (Session 4)	26.3	28.9	20.2	26.8	26.6
Hyperinflation (Session 1)	77.3	72.4	76.0	67.3	83.0
Hyperinflation (Session 2)	72.1	73.1	70.2	76.2	70.2
Hyperinflation (Session 3)	73.4	79.4	79.9	79.5	69.6

Table 6: Actual Inflation Rates for All Sessions

with the fraction of inconsistent females being larger in all treatments.

	Average Expectations for Overall Basket	Average of Weighted Average of Expectations	Proportion of Participants who are inconsistent	Proportion of Males who are inconsistent	Proportion of Females who are inconsistent
Low Inflation	16.19	11.81	0.67	0.54	0.73
Intermediate Inflation	21.62	14.32	0.65	0.47	0.79
Hyperinflation	31.47	26.59	0.57	0.47	0.62

Table 7: Weighted Averages for Average Expectations

4 Discussion and Conclusion

In this paper we studied inflation expectations in a hyperinflation environment, compared to a low or intermediate inflation environment. We posit a novel hypothesis called "**perception accuracy inversion**": the quality of calibration of inflation expectations improves as we move from low to intermediate inflation, but after some level of inflation the accuracy begins to decline. We conducted a lab experiment with student participants, which provided empirical support for the '*perception accuracy inversion*' hypothesis.

Our results showed that there is a monotonic increase in inflation expectations, as the actual average inflation rate increases in the laboratory economy. However, there also seems to be strong underestimation of inflation in the hyperinflation domain, which we did not predict. Surprisingly, average expectations across the three environments do not

vary as much as one would expect, despite the significant difference in actual inflation rates across treatments. One possibility is that some anchor external to the laboratory is driving this, potentially perceptions about inflation in the real world. The finding that there is no significant differences between expectations across inflation environment suggests possible challenges in accurately assessing and responding to different inflationary conditions, and could have significant implications for economic policy and stability.

While we acknowledge the complexity of real-world hyperinflation scenarios, our experiment intentionally focused on a simplified case, in which the rate of inflation was held constant from one month to the other. To our knowledge, this study is the first to directly address this question in the context of hyperinflation. Future research could extend our design to incorporate more complex settings, and could take several possible directions. A promising one would be to vary the volatility of inflation, since it has been argued that higher inflation is associated with larger volatility.

At the theory level, it would be important to examine a model that derives the inflection point endogenously, as this would greatly enhance our understanding of the underlying mechanisms behind the perception accuracy inversion phenomenon.

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A Appendix

A.1 Median Expectations

	Median Expected Total Inflation	Median Expected Inflation (Good A)	Median Expected Inflation (Good B)	Median Expected Inflation (Good C)	Median Expected Inflation (Good D)
Low Inflation	9.0	5.0	6.9	5.80	6.0
Intermediate Inflation	13.0	10.0	10.0	10.00	10.0
Hyperinflation	20.0	20.0	20.0	13.35	11.5

Table A1: Median Expectations

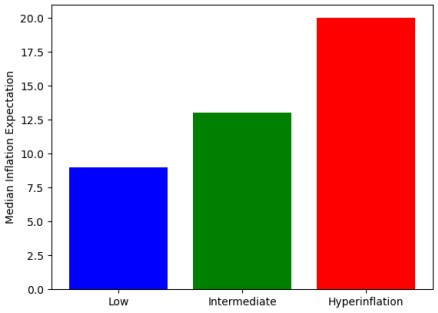

Figure A1: Median Expectations across all 3 Treatments

A.2 Median Percentage Deviations

	Median Percentage Deviation (Whole Basket)	Median Percentage Deviation (Good A)	Median Percentage Deviation (Good B)	Median Percentage Deviation (Good C)	Median Percentage Deviation (Good D)
Low Inflation	160.14	66.85	83.39	69.54	79.08
Intermediate Inflation	-56.06	-56.90	-56.87	-65.40	-69.21
Hyperinflation	-73.44	-72.64	-73.68	-82.86	-83.54

Table A2: Median Percentage Deviations from Actual Inflation rates

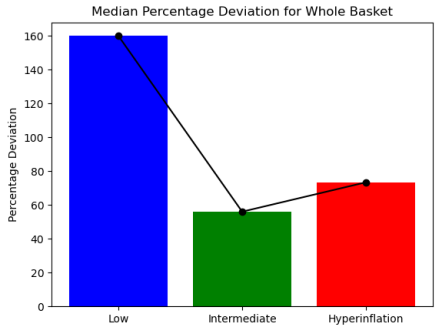

Figure A2: Absolute (Percentage) deviations (Whole Basket).

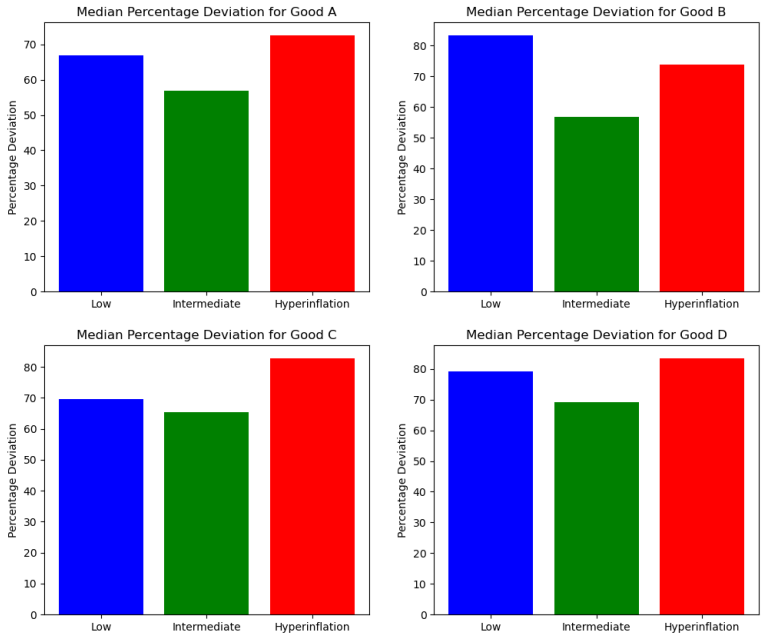

Figure A3: Absolute (Percentage) deviations for each individual good A,B,C,D.

A.3 Weighted Average for Median Expectations

	Median Expectations for Overall Basket	Median of the Weighted Average of Expectations
Low Inflation	9.0	7.22
Intermediate Inflation	13.0	11.75
Hyperinflation	20.0	18.28

Table A3: Weighted Averages for Median Expectations