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Norms, moods, and free lunch: Longitudinal evidence on payments from a Pay-What-You-Want restaurant

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ABSTRACT

We study the distribution and evolution of payments in a Pay-What-You-Want restaurant. Despite missing price tags and despite the option to pay nothing at all, we observe that the vast majority of guests makes strictly positive payments. Over the two years covered by our data, average payments decline slightly, converging at a positive level. At the same time, the number of daily guests increases steadily, resulting in a considerable increase in total revenues. We discuss one possible interpretation of the long-term trend in payments in terms of social norms. We further show that short-term fluctuations in average payments are partly explained by exogenous weather changes. We provide evidence that – in line with work in psychology – weather-induced changes in mood affect payments.

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1. Introduction

Prices are a fundamental concept in economics. They serve as a powerful device to allocate resources and there is a long tradition of studying price formation and pricing strategies in (more or less) competitive markets. Yet, economists know little about a pricing scheme that has recently gained considerable attention: Pay-What-You-Want pricing (henceforth PWYW). Anecdotal evidence indicates a steady dispersion of PWYW schemes in quite different markets.[1] Among the most prominent cases was the release of a PWYW album by the band Radiohead in 2007. In total, the album was downloaded approximately two million times. According to comScore, 40% of those who downloaded paid for it, at an average of $6 each.[2] Hence, despite missing price tags, (some) consumers pay positive prices. This point is confirmed in the recent field experiment by Gneezy et al. (2010). During eight days, they offered visitors at Disneyland a souvenir photo. In one treatment, the photos were sold at a fixed price, in another treatment, people could pay what they wanted. The authors identify a positive effect of PWYW on photo revenues.[3] While their evidence convincingly documents a substantial amount of positive payments in a one-shot setting, it remains unclear to which extent we would observe positive payments over a longer period – in particular, in a market where consumers can self-select into a PWYW institution and repeatedly face a PWYW scheme with the same 'seller'.

The main contribution of this paper is to provide systematic evidence on the evolution of payments and revenues in a PWYW restaurant in Vienna, where consumers can pay what they want for food. We observe more than 80,000 individual payments over two years. None of the customers is pivotal to the existence of the restaurant and no customer is excluded from visiting again, independent of past payments. Consequently, individuals who are solely driven by monetary self interest should pay nothing. In line with other evidence, we clearly reject this prediction. Only 0.5% of all payments are zero. In the first six months after the restaurant's opening, the average payment was € 5.65. In the following two years, payments steadily declined, but only by 12% to an average of € 5. Making use of the micro data, we find that the decline occurred basically in all deciles of the payment distribution, but the decline

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[1] See the literature discussed below, in particular, Kim et al. (2009). Stephen Dubner's *NY Times* blog offers further anecdotes on various PWYW business models.

[2] Wired Magazine, No. 16/01, accessible online at http://www.wired.com/entertainment/music/magazine/16-01/ff_yorke.

[3] Gneezy et al. (2010) interact the fixed-price versus PWYW – treatment with a charity treatment, where half of the photo revenues went to a patient-support foundation. It turns out that the positive effect of PWYW on revenues is particularly strong in the interaction with the charity treatment.

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was substantially stronger at the top quartile of the payment distribution as compared to the lower quartile. The data further reveal that the decline in payments slowed down over time, suggesting a convergence of payments. While our data do not allow us to identify the motives for positive PWYW payments, we note that the observed pattern is consistent with models of social norms and fits the concept of norm convergence (Azar, 2004, 2007; Mengel, 2008).

We further document that the number of daily guests increased by more than 50% during our observation period. Hence, PWYW seems to attract customers. Since payments declined only modestly, the restaurant experienced an increase in revenues from PWYW payments by nearly 40%. This underestimates the overall increase in revenues, as it does not include revenues from drinks (which are sold at fixed prices). Summarizing the first set of findings, we document that positive PWYW payments survive over time: despite the option to self-select into the restaurant and to pay nothing at all, nearly all people make strictly positive payments. As the positive payments are fairly stable, the sizable increase in customers translated into a considerable rise in PWYW revenues. This finding is the first contribution of our paper.

The second contribution is to highlight the role of moods in explaining short-term variation in payments. Moods affect people's behavior beyond more sophisticated and conscious decision strategies. This notion finds support by the experimental evidence from Loewenstein (2004) and Kirchsteiger et al. (2006). A solid body of psychological research further documents the impact of weather on moods (see, for instance, Keller et al., 2005). Motivated by this evidence, we consider weather-induced changes in moods and document their impact on individual PWYW payments. Controlling for temperature, our data reveal a significant influence of sunshine on payments. The effect differs between different seasons: during summer months, long sunny periods have a negative effect on PWYW payments, whereas there is a positive relationship in autumn. These results are in line with the findings by Keller et al. (2005), who observe seasonal specific effects on self reported mood variables.

As pointed out above, longitudinal evidence on payments in an 'open' PWYW institution – i.e., a market where consumers can self-select into PWYW – is scant. Kim et al. (2009) conducted three experiments, in which they temporarily (for up to two weeks) introduced PWYW at a 'conventional', posted-price restaurant, a cinema and a deli. They find significantly positive PWYW payments and, in two of the three experiments (deli and restaurant), an increase in short-run revenues. The rich design of their study also included a complementary survey, which indicates that payments are mainly driven by what consumers consider as a fair price. Results for a related pricing scheme is provided by Levitt (2006). For the period 1993–2001, he finds a modest decline of voluntary payments for bagels and donuts under an *honor system*. Under an honor system, however, there are usually explicitly posted prices (see, e.g., Pruckner and Sausgruber, 2009). In Levitt's case, these prices changed several times during the observation period, and the price increases indeed had a positive effect on voluntary payments. A recent paper by Regner and Barria (2009) studies voluntary payments at an online music label. Similar to Levitt's study – but in contrast to our case – payments are made without face-to-face communication. Moreover, the music label posted binding minimum prices. Gautier and van der Klaauw (2011) analyze voluntary payments for a hotel stay during a special promotional campaign. Again, their research design included explicitly posted prices. The absence of any prices or pre-existing payment recommendations – which may serve as reference points – is the key difference of all of these papers to the PWYW institution studied in our paper. Moreover, none of these contributions considers the role of moods or studies the evolution of PWYW revenues over a longer period.

Table 1
Mean payments and number of daily guests per half year (standard deviation in parenthesis).

	Payment	Guests per day	No. obs.
2005 1st half (first 3 days)	5.54 (2.11)	142.76 (7.77)	427
2005 2nd half	5.65 (1.97)	135.32 (37.67)	17,572
2006 1st half	5.38 (1.85)	149.47 (28.15)	20,917
2006 2nd half	5.13 (1.70)	175.61 (55.54)	19,724
2007 1st half	4.97 (1.85)	212.12 (43.36)	23,001
Total	5.26 (1.86)	170.36 (51.59)	81,641

The remainder of the paper proceeds as follows. Section 2 describes our data and offers a descriptive analysis of PWYW payments and revenues. Section 3 discusses a framework to understand the long-term evolution of as well as the short-term fluctuations in payments. We derive predictions which are then confronted with the data in Section 4. Section 5 concludes.

2. Data and descriptive analysis

Our data come from a PWYW restaurant ('*Wiener Deewan*') in the city center of Vienna. The restaurant offers self-service, buffet-style Pakistani food (lunch and dinner; opening hours are Monday to Saturday, 11 am to 11 pm) and is considered one of the best curry huts in the city. The drinks have fixed prices (at standard price levels), but guests may pay as they wish for the food. Before leaving the place, consumers pay their drinks plus the voluntary PWYW payment. The total amount is paid at the counter in a face-to-face interaction with restaurant staff. The staff records the voluntary payment in classes of 50 €-cents. Zero payments are possible and are recorded, too. If someone pays for $n \geq 2$ guests from a table, the average PWYW payment per person is recorded. Note that no single customer is pivotal to the existence of the restaurant and no customer is excluded from visiting again, independent of past payments. Let us further stress that the restaurant is operated on a self-service basis: service personnel only cleans up the table after guests leave. Hence, the tipping component in PWYW payments can be treated as negligible.[4] Finally, note that the restaurant has no air conditioning, like the vast majority of places in Vienna.

2.1. PWYW payments

Table 1 shows summary statistics on payments and the number of guests for the first two years after the opening of the restaurant in June 2005. The sample period covers 81,641 individual payments. Overall, an average of 170 daily guests were served at the restaurant's 19 tables. The average PWYW payment was € 5.26. Over time, payments declined from € 5.64 in the second half of 2005 to € 4.97 in the first half of 2007.[5] At the same time, the number of daily guests increased steadily.[6]

[4] If people were – despite the missing service component – guided by tipping norms (Azar, 2004, 2007) – one should note that Austria has no 'percentage' tipping norm as it is common in North America. Austrians simply bring the amount up to a round sum. For a regularly priced coke at € 2.10, a guest might then pay € 2.50. Compliance with the Austrian tipping norm might therefore explain some positive PWYW payments, but it certainly does not account for payments with a median of € 5. Recall further that guests pay the total amount for the drinks *plus* the PWYW payment. Hence, a PWYW norm of € 5 does in general not assure paying a round sum.

[5] To put these number into perspective, note that the average price for a set lunch at a comparable restaurant in this part of Vienna was approximately € 7.50 during our sample period.

[6] A considerable fraction of these guests visited the restaurant repeatedly. Data from a survey conducted in June 2007 indicate that 81% (50%) of the guests eat at least once (twice) per month at the restaurant (Riener, 2010).

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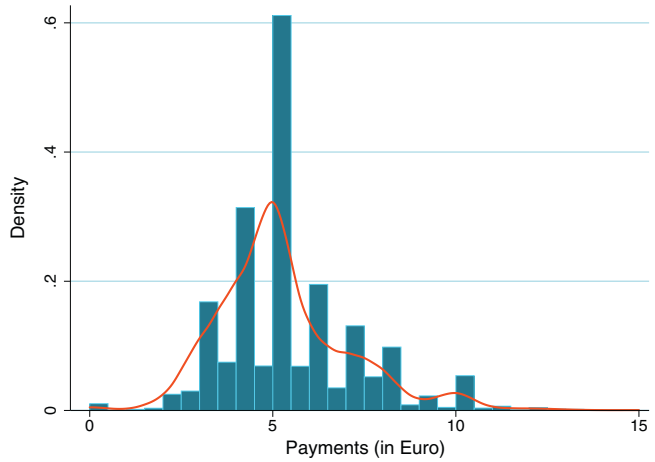


Fig. 1. Distribution of payments. *Note*: Histogram of individual payments with a kernel density estimate (Parzen kernel function with a width of 1.5).

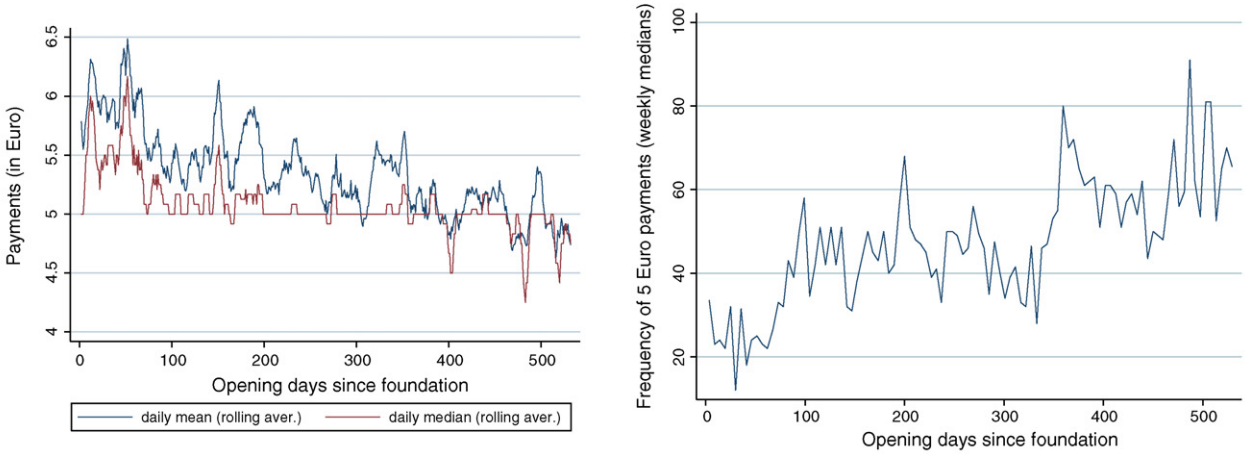
The distribution of payments is illustrated in Fig. 1. Despite the option to pay nothing at all, the fraction of zero payments [payments of € 1 or less] accounts for only 0.53% [0.63%] of all observations. The clear mode and median of the payment distribution is at € 5. Non-round payments (3.50, 4.50, 5.50, etc.) occur at a much lower frequency. Note further that the distribution is positively skewed. At the top of the distribution, more than 4% of payments are above € 10.

The left panel of Fig. 2 illustrates the evolution of PWYW payments over time. In the first hundred days after the opening, average payments were typically above € 5.50. In the following 100 days, the mean fluctuated around € 5.50. For days 200–400, mean payments were in the range between € 5.00 and € 5.50. After the first 400 days, average payments started to drop below the level of € 5.00. The median payment followed a similar trend: initially there was substantial variation, with median payments above € 6.00. After the first 100 days, the median converged quickly to € 5.00. Between days 200 and 450, the median payment remained almost constant at this value – which may have served as a focal point. The median falls short of this level only at the end of our observation period.

The right panel of Fig. 2 displays the weekly frequency of € 5-payments. While only 20–30% of all payments were exactly € 5 during the first 100 days, this share increased and fluctuated between 30 and 60% for a long time. After 350 opening days, the frequency further increase and remained in the range between roughly 50–80%. For the last 100 opening days covered by our sample, more than 70% of all payments were exactly € 5. During this period, there is one week in which more than 90% of customers made PWYW payments of exactly € 5.

2.2. Daily guests and PWYW revenues

The average number of daily guests increased from 102.89 during the first 100 days after the restaurant opened up to 212.11 during the last 100 days covered by our sample. The increase in guests is still sizeable, but less pronounced if one compares the first (roughly 140 guests) with the last half year of our observational period (about 210 guests; see Table 1). The upward trend is also depicted in Fig. 3. Since the decline in PWYW payments was only modest, the increasing popularity of the restaurant resulted in a substantial increase in revenues. The evolution of revenues from PWYW payments (i.e., without revenues from drinks) is displayed in Fig. 3. The figure shows that daily PWYW revenues initially fluctuated in the range of € 500–900. After a short slump around day 300 (corresponding to July and August 2007, when many people from Vienna are on vacation), daily PWYW revenues moved within the range of € 750–1200. A clear picture is also provided by the following comparison: in the first full month covered by our data, PWYW revenues amounted to € 14,460. In the last month, the corresponding figure was € 27,262 – nearly twice as large. The increase in revenues would be even more pronounced if one includede the revenues from drinks (which are not covered by our data). Hence, regarding revenues, the restaurant developed successfully. While we do not have precise information about the restaurant's costs for food per person, we know that it is substantially below € 5. Since average PWYW payments remained close to € 5, the boost in the total number of guests should therefore translate into higher profits. In addition, the increase in the number of guests should also generate higher profits from drinks, too (given that prices for drinks are above the restaurant's marginal costs). Without further information on the restaurant's profits (as well as its counterfactual profits for the hypothetical case under a standard, posted price regime), however, one cannot judge the absolute success of PWYW.



Note: The left panel displays the evolution of daily mean and median PWYW payments (with a 6-day rolling average); the right panel shows the frequency of € 5 payments per week.

Fig. 2. Evolution of PWYW payments over time. *Note*: The left panel displays the evolution of daily mean and median PWYW payments (with a 6-day rolling average); the right panel shows the frequency of € 5 payments per week.

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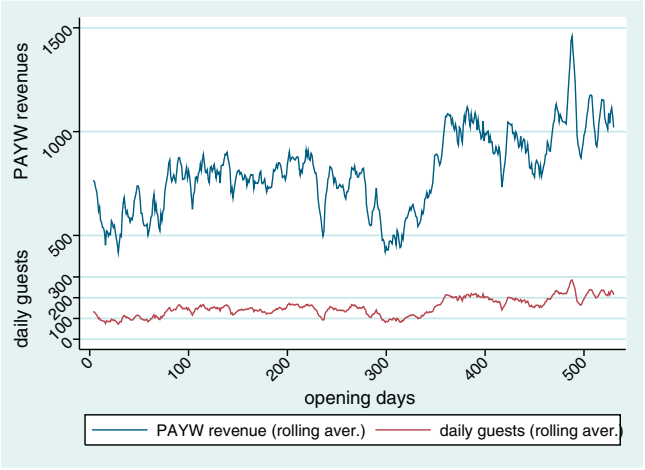

Fig. 3. Development of daily guests and daily PWYW revenues.

Nonetheless, it is interesting to see that, in contrast to the scenario in which the restaurant quickly goes bankrupt because of selfish consumers who self-select into the restaurant to regularly enjoy a free lunch (or dinner), the PWYW restaurant successfully managed to survive in a competitive market for more than two years.

3. Explaining PWYW payments: norms and moods

3.1. Explaining long-term trends: social norms

One possible way to interpret the substantial fraction of positive payments and the payment trend observed in our data is based on social norms (Elster, 1989). A rational *homo oeconomicus* has little reason to make a positive payment at this restaurant. However, in the context of social norms, individuals may face costs of deviating from what is considered to be the payment norm – in particular, from undercutting the norm.[7] In principle, these costs could stem from internal, emotional sanctions (feelings like shame or guilt, associated with an internalized social norm) as well as from external norm enforcement. The latter might take the form of social disapproval by other guests or the restaurant staff – recall that payments are made in a face-to-face interaction – or sanctions in repeated interaction (e.g., unfriendly treatment at the next visit). Individuals then face a trade off between compliance with the payment norm and economizing on PWYW payments. Hence, positive payments can be rational.[8]

Interpreting our data from the perspective of a social norms framework, one might argue that initially, when the restaurant opened, a norm had not yet been established. Over time, guests who come repeatedly might learn about the payments of their peers and accordingly update their perceptions about what is considered to be the norm. The individuals' behavior shapes a norm – e.g., stick to the average payments among your peers – and the norm induces a certain behavior. Individuals balance their marginal costs from undercutting the payment norm – and incurring internal or external sanctions – with their marginal economic gains. Payments might then converge either to a positive payment norm or the norm completely erodes. In the latter case, PWYW payments would soon approach zero. Our data clearly reject the case of norm erosion. Fig. 2 illustrates that average payments declined, but median payments converged to a level of € 5. At the end of our sample period, there are some weeks where more than 80% of all payments were exactly € 5. One might argue that over time this level was perceived as the payment norm.

Based on our data it is hard to come up with a direct test of our interpretation of the payment trends in terms of social norms and norm convergence.[9] Nevertheless, one can derive several testable predictions. First, a convergence pattern implies that the variance of payments should decline over time and that one should observe a higher fraction of payments that are in line with the payment norm. The observed decline in the standard deviation of payments (see Table 1) and the evolution of the frequency of € 5-payments (see right panel of Fig. 2) are in line with this prediction. As the initial payment distribution is positively skewed (with higher payments being further away from the initial mean than lower payments), convergence further implies that we should observe a stronger decline in PWYW payments at the top of the payment distribution as compared to the lower end of the distribution. To consider this possibility, we will run quantile regressions to study whether the evolution of payments over time differs for different segments of the payment distribution.

Second, payments might be sensitive to the number of guests at the restaurant. In particular, we expect that the scope for social disapproval by other guests or by the restaurant staff (e.g., while paying at the counter) is smaller on busy days with many guests. If this is the case, we expect the number of guests to have a negative impact on PWYW payments. It is not clear, however, if there is indeed less disapproval by the restaurant staff on busy days. Expressing disapproval does not require a long time and it is often an automatic, non-volitional response. One could even come up with the opposite prediction: if there were very few people at the restaurant, more people could also increase the scope for social disapproval. However, we do not think that our data are in this range. The popularity of the place resulted in a substantial amount of guests eating at the restaurant from the very first opening day. Hence, we hardly observe any days where there are few guests at the restaurant.[10] One could also argue that the quality of the service is lower on busy days. Recall, however, that there is hardly any service at this restaurant in the first place (see Section 2 above). It is nevertheless possible that a high number of guests makes the stay in the restaurant less pleasant, affecting negatively the customers' payments.

Third, we expect the composition of the restaurant's guests to have an impact on payments. The PWYW restaurant is closely located to the main building of the University of Vienna, on the one hand, and to the Vienna Stock Exchange, on the other hand. This location produces a quite heterogeneous composition of guests. A survey conducted in the first week of June 2007 (during the term) finds that 62% of guests were university students. The remaining guests were mainly mid-level and some managerial employees (Riener, 2010). This distribution is strongly affected by term breaks and other university holidays, when the student share drops well below 50%. In the context of a type-specific norm, well-dressed employees are expected – by their own peers as well as the restaurant staff – to pay significantly more than an undergraduate student. We therefore expect to observe significantly higher

[7] There might also be individuals who decide to pay more than the norm, in order to gain social approval.

[8] See Akerlof (1980) for a classical model on social norms, as well as Azar (2004, 2007), Balestrino and Ciardi (2008), Lopez-Perez (2009), Mengel (2008) or Traxler (2010) for more recent contributions.

[9] The survey data from Kim et al. (2009) indicate that PWYW payments are shaped by consumers' considerations about a fair price. This might be interpreted as an internalized norm about making a fair payment.

[10] Only on 5 out of the 532 days covered by our data, there are less than 50 guests at the restaurant. Communication with the restaurant staff suggests that they perceive the place to be busy with 100 or more guests – which is the case on 91% of all days in our sample.

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payments during university holidays (controlling for the number of guests and season-specific effects), when fewer students and more employees eat at the restaurant. Even with one homogeneous payment norm, we would arrive at the same prediction, when income effects alter the marginal costs and benefits from norm compliance for the different types of guests. For business people, the marginal benefits from saving 50 cent by undercutting a payment norm might be smaller than for students. In either case, we expect higher payments during university holidays.

3.2. Moods as driving source of short-run fluctuations?

Beyond the long-term trend, there is quite some variation in payments within short time periods. One reason behind these fluctuations in PWYW payments could be related to changes in moods. Moods affect people's behavior on top of more sophisticated and conscious decision strategies that trade off the marginal costs and benefits from PWYW payments (see, among many others, Loewenstein, 2004). A widely recognized channel capable of changing moods is weather.[11] In a seminal study in social psychology, Cunningham (1979) examined altruistic behavior and its relation to temperature, sunshine and other weather variables. He found a strong relationship between the amount of sunshine and pro-social behavior and weaker relations for temperature. He also reported positive correlation between tipping behavior and sunshine in a restaurant. This in line with the experimental evidence from Kirchsteiger et al. (2006), who show that good mood implies more generosity. Keller et al. (2005) review results of a study by Watson (2000) on the influence of weather on self-reported mood. While Watson did not find any effect of weather variables (sunshine, temperature, barometric pressure and precipitation) over the whole year, Keller et al. (2005) considered season-specific effects. They found that pleasant weather – with the notion of 'pleasant' depending on the season – has a significant impact on moods. These results are in line with psychological models as, e.g., Anderson's (1989) analysis of weather and aggression: 'discomfort' – deviation from an comfortable weather situation – plays a significant role in determining moods.

Given this body of evidence, we expect people who are in good mood to pay more in our PWYW restaurant. As we do not have access to any direct measure of mood, we use exogenous variation in weather conditions that is correlated with peoples' mood (Keller et al., 2005). The identification of weather-induced changes in mood on PWYW payments is complicated by the fact that variation in weather alters behavior beyond moods. Most importantly, people might adjust the quantity they eat and drink. If, for instance, people drink more on sunny days, the increased consumption of drinks – that have fixed prices – might crowd-out the generosity for PWYW payments for food. As we do not observe the amount of drinks and food consumed, we have to control for correlates of drinking and food intake. In a comprehensive review of the literature, Stroebele and De Castro (2004) show that temperature influences food intake, whereas sunshine does not. People eat more in cold periods, as the body needs more energy to keep the body temperature. A similar statement can be made regarding beverages: higher temperature causes higher consumption of beverages (Wansink, 2004). However, there is no evidence that sunshine *per se* (i.e., after controlling for temperature) has any effect. Based on this evidence, we will make the identifying assumption that – after controlling for temperature – sunshine only affects PWYW payments via the impact on people's mood.

3.3. Empirical approach

In the following, we use $PWYW_{it}$, an individual PWYW payment (not including drinks) on day t, as dependent variable. We account for a non-linear time trend, captured by the coefficients α_1 and α_2 (Day_t counts the restaurant's opening days since foundation). As additional control variables we include the number of guests, $Guests_t$, and a dummy indicating University holidays, $Holiday_t$. As discussed above, we expect the number of guests to have a negative impact and the change in guest types during university holidays to have a positive impact on PWYW payments, i.e., $\beta_1 < 0$ and $\beta_2 > 0$.

To assess the effect of weather-induced changes in moods, we use data on sunshine duration, Sun_t, and the average daily temperature in Vienna, $Temp_t$, provided by the Austrian Institute for Meteorology and Geodynamics. Motivated by the results from Keller et al. (2005) discussed above, our main focus is on γ_1, which measures the season-specific effects of sunshine on PWYW payments. In addition, we control for season-specific effects as well as temperature.[12] The estimated model is

$$\begin{aligned} PWYW_{it} &= \alpha_1 Day_t + \alpha_2 Day_t^2 + \beta_1 Guests_t + \beta_2 Holiday_t \\ &+ \boldsymbol{\gamma}_0 \begin{pmatrix} Spring_t \\ Summer_t \\ Fall_t \\ Winter_t \end{pmatrix} + \boldsymbol{\gamma}_1 Sun_t \times \begin{pmatrix} Spring_t \\ Summer_t \\ Fall_t \\ Winter_t \end{pmatrix} \\ &+ \boldsymbol{\gamma}_3 Temp_t + \epsilon_{it} \end{aligned} \tag{1}$$

As argued above, by controlling for temperature, we capture weather-related changes in consumption of food and drinks that might affect payments. However, temperature might also affect people's mood. Thus, the coefficient of temperature is hard to interpret and of minor interest. In contrast, the γ_1 coefficients on sunshine should capture the mood-related changes in behavior after controlling for temperature. Hence, the vector γ_1 will give us conservative estimates for the effects of weather-induced mood changes on PWYW payments.

4. Results

We start having a look at the long-run trend in payments. In a first specification, we regress individual payments on a linear and squared time trend. As additional controls, we only include a full set of weekday dummies (not reported) and season-specific effects. The estimation results, reported in column (1) of Table 2, confirm the visual impression obtained from Fig. 1. Payments decline, but the decline becomes smaller over time, suggesting a convergence pattern. The case of convergence is further backed by quantile regressions, reported in Table 3. For the relevant period covered by our sample, the estimated coefficients imply a substantially stronger decline in payments at the top quartile of the payment distribution, as compared to the lowest quartile. This implies that the spread in the payment distribution declined over time. Qualitatively similar results are obtained for the highest and lowest decile, respectively.

[11] While the connection between weather, moods and behavior has been subject to research in nearly all areas of social science, the evidence for economic behavior is mostly focused on financial markets. The analysis by Saunders (1993) suggests that NY stock prices are correlated with cloud cover: denser cloud cover goes hand in hand with lower stock indices. Similar findings are discussed by Hirshleifer and Shumway (2003).

[12] As Eq. (1) does not include a constant, we can use dummies for all four seasons without getting perfect multicollinearity. Note that we do not include variables for the season-specific effect of temperature. This is motivated by the evidence from Stroebele and De Castro (2004), which points to an absolute rather than a season-specific effect of temperature on consumption. Moreover, non-interacted effects are absorbed by the season dummies.

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Table 2
Regression results (dependent variable: $PWYW_{it}$).

	(1)	(2)	(3)	(4)
Opening days since foundation	−0.0020***	−0.0020***	−0.0017***	−0.0017***
	(0.0003)	(0.0003)	(0.0003)	(0.0003)
Opening days, squared	0.98*** 10^{-6}	1.35*** 10^{-6}	0.96** 10^{-6}	0.83** 10^{-6}
	(0.38 10^{-6})	(0.37 10^{-6})	(0.38 10^{-6})	(0.40 10^{-6})
Number of guests		−0.0016***	−0.0012***	−0.0012***
		(0.0004)	(0.0004)	(0.0005)
University holidays			0.2539***	0.2530***
			(0.0509)	(0.0531)
Sun × Spring				−0.0035
				(0.0051)
Sun × Summer				−0.0393***
				(0.0075)
Sun × Autumn				0.0163***
				(0.0062)
Sun × Winter				0.0050
				(0.0076)
Temperature				0.0003
				(0.0003)
Spring	6.107***	6.282***	6.163***	6.136***
	(0.065)	(0.074)	(0.078)	(0.099)
Summer	6.294***	6.396***	6.132***	6.384***
	(0.066)	(0.038)	(0.082)	(0.121)
Autumn	6.112***	6.292***	6.182***	6.038***
	(0.062)	(0.074)	(0.078)	(0.093)
Winter	6.261***	6.415***	6.283***	6.239***
	(0.067)	(0.074)	(0.077)	(0.084)
Observations	81,477	81,477	81,477	81,050
R^2	0.891	0.892	0.892	0.893

Notes: OLS estimations with standard errors (robust to heteroscedasticity and clustered on observation day) in parentheses. All estimations include a full series of weekday dummies. The weather time-series starts with July 1, 2005. Specification (4) thus drops the observations from the last 3 days in June 2005.
*** Significance at the 1%-level.
** Significance at the 5%-level.

Table 3
Quantile regressions (dependent variable: $PWYW_{it}$).

	10th pctl. (1)	25th pctl. (2)	75th pctl. (3)	90th pctl. (4)
Opening days since foundation	−0.0020	−0.0022	−0.0031	−0.0036
	(0.0000)	(0.0000)	(0.0002)	(0.0002)
Opening days, squared	0.77 10^{-6}	0.83 10^{-6}	0.86 10^{-6}	0.98 10^{-6}
	(0.17 10^{-6})	(0.23 10^{-6})	(0.25 10^{-6})	(0.37 10^{-6})
Number of guests	−0.0001	−0.0000	−0.0036	−0.0040
	(0.0000)	(0.0000)	(0.0002)	(0.0003)
University holidays	0.4321	0.5007	0.4547	0.2926
	(0.008)	(0.0002)	(0.0341)	(0.0394)
Spring	3.632	4.054	7.352	9.170
	(0.061)	(0.040)	(0.065)	(0.077)
Summer	3.750	4.719	8.070	10.066
	(0.066)	(0.045)	(0.070)	(0.098)
Autumn	3.597	4.031	7.118	8.944
	(0.069)	(0.058)	(0.076)	(0.125)
Winter	3.634	4.053	7.431	9.112
	(0.067)	(0.051)	(0.063)	(0.091)
Observations	81,477	81,477	81,477	81,477

Notes: Estimation results from quantile regressions with standard errors in parentheses. Each reported coefficient is significant at the 1%-level.

Specification (2) of Table 2 includes the number of guests as an additional explanatory variable. As motivated above, we expect the variable to have a negative effect on PWYW payments. The regression confirms this expectation, showing a highly significant effect. The coefficient indicates that a one standard deviation increase in the number of daily guests results in a modest decline in individual payments of 8 cent (1.5% of the average payment). Recall that the restaurant is quite busy on nearly all days covered by our sample (see fn. 10). Hence, as discussed above, one might interpret this finding as evidence that the scope for norm enforcement (e.g., via social disapproval) is only slightly smaller on busy days with many guests in the restaurant. An alternative interpretation would be that payments are lower on days when the stay in the restaurant is less pleasant, as it is more crowded.[13] From a revenue-maximizing perspective, the finding is interesting, as it highlights that PWYW revenues do not monotonically increase in the number of daily guests. However, the point estimates from column (2) suggest that revenues would be maximized with roughly 1500 daily guests – which is clearly beyond the restaurant's capacity limit. The maximum number of daily guests observed in our sample is 340.

[13] One might question the direction of causality underlying this effect. Addressing this concern, we ran 2SLS regressions using extreme weather events as instruments for the number of guests. The estimates yield qualitatively very similar results (available from the authors).

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Specification (3) of Table 2 estimates the impact from the change in the composition of guests at the restaurant that is associated with a university holiday. The estimated coefficient on the holiday dummy is highly significant and – confirming our expectations – positive. PWYW payments are 25 cent (5% of average payments) higher when the university is closed, i.e., when fewer students and relatively more business people eat at the restaurant.[14] The observation is in line with the evidence from Kim et al. (2009), who report a positive correlation between income and PWYW payments. In our case, one could interpret this finding as an indicator for a heterogeneous payment norm. Well-dressed employees might be expected to pay more that an undergraduate student. Alternatively, the estimate might simply reflect an income effect.

In Table 3, we estimate specification (3) from Table 2 using quantile regressions. We consider the 10th, 25th, 75th and 90th percentile of the payment distribution (corresponding to payments of approximately 3.6, 4.3, 7.5 and 9.3€, respectively). The results are reported in columns (1)–(4) of Table 3. Next to the differences in the long-term payment decline discussed above, the estimates reveal substantial differences in the impact of the number of guests. For payments at the lower tail of the distribution (see column (1) and (2)), the number of guests has a statistically significant, but economically insignificant, negative impact. For payments at the top quartile and decile, however, the effect is more than twice as strong as for the average (reported in Table 2). Hence, it is mainly those who usually make the highest PWYW payments that reduce their generosity once there are many other guests at the restaurant.

While this finding does not identify the mechanism behind the negative effect of more guests on payments, one might use the observation to speculate about the different interpretations of the effect (see Section 3.1). If, on the one hand, the negative effect is driven by customers who pay less because they perceive the stay at the restaurant on a crowded day as less pleasant, this should affect *all* payments negatively – assuming that all guests' payments are equally affected by their perceptions, and that these perceptions are equally sensitive to the number of guests. If, on the other hand, the negative effect reflects a decline in external norm enforcement on busy days, this should mainly affect high payments, if the latter stem from those who are most sensitive to social disapproval. The estimation results from Table 3 support the latter interpretation.[15]

Let us finally turn to the impact of the weather variables. Column (4) in Table 2 presents the results from OLS estimations of the full model (see Eq. (1)). While the estimates document an (economically and statistically) insignificant effect of temperature, there are significant season-specific effects from sunshine. There are non-negligible effects that point into opposite directions: more sunshine decreases PWYW payments during summer, but increases payments during autumn. During winter, the effect of sunshine is positive, but insignificant.[16] The coefficients imply that a one standard deviation increase in the hours of sunshine results in an increase [decrease] of average payments by 11 [17] cent during autumn [summer]. Putting these findings into perspective, note first that the summer which dominates in our sample period is the unusually sunny summer of the year 2006, when sunshine duration was 10–30% above the long-run average from 1971 to 2000. Second, our findings are in line with the season-specific effect of weather on moods reported in Keller et al. (2005): more people are in a good mood on (usually gray) autumn days with atypically long sunshine hours. At the same time, Keller et al. report that people's moods declined with sunshine duration during summer. This is also in line with Anderson's (1989) notion of 'discomfort' in terms of deviation from an agreeable state. In the light of these observations, our estimates suggest a positive correlation of mood with PWYW payments.[17]

5. Conclusions

This papers discusses evidence on voluntary payments for food in a Pay-What-You-Want restaurant. Studying the distribution and the evolution of PWYW payments, we observe that less than 1% of the guests make zero payments. Nearly 5% of payments are above € 10 and median payments are around € 5. During the two years after the opening of the restaurant, average PWYW payments declined; however, the decline was only modest. Moreover, the data indicate a stabilization of PWYW payments at a positive level.

From a business perspective, it is remarkable to see that a restaurant that allows its guests to pay as they want for food manages to survive in a competitive market for more than two years. In contrast to the scenario in which the restaurant quickly goes bankrupt because of selfish consumers that self-select into the restaurant to regularly enjoy a free lunch (or dinner), the restaurant gained more and more customers, but voluntary payments are far from declining to zero. This resulted in a substantial increase in revenues. Hence, our study complements the short-run evidence from Gneezy et al. (2010), who show that PWYW might outperform business with regular pricing schemes. Our data indicate that PWYW pricing might be a viable pricing strategy in the long-run. In future research, it would be interesting to study how PWYW pricing performs in other markets, in particular when there is 'competition' between multiple PWYW institutions.

Considering short-run fluctuations in PWYW payments, we find evidence that supports the role of moods for economic behavior. Controlling for temperature, we observe significant, season-specific effects of sunshine on payments. During summer, longer periods of sunshine are negatively correlated with payments, while in autumn this correlation is positive. These effects are consistent with the findings on *self reported* mood in Keller et al. (2005). Hence, our study complements this evidence by showing the influence of sunshine on real-world behavior.

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[14] The increase in individual payments on university holidays is further amplified by the decline in the number of guests. On average, the restaurant counts 66 fewer guests during term breaks, which – according to our estimates – results in an additional increase in individual PWYW payments by 11 cent.

[15] Note, however, that the first interpretation would also be in line with the data if those who make high payments were particularly sensitive to, e.g., the noise at the restaurant on a very busy day.

[16] This might be due to the fact that the winter months overlap with the exam period at the University of Vienna. During this time, students (who account for a large fraction of consumers at the restaurant) may be hit by major shocks in their moods which dominate the weather-induced variation in moods.

[17] One might argue that weather conditions also change the time guests spend at the restaurant. Guests might be more likely to leave quickly after finishing lunch and enjoy the sun (during autumn) or cool down under the trees of a nearby park (during summer; recall that there is no air conditioning at the restaurant). It is unclear, however, why 'leaving quickly' should have a positive effect on payments during autumn, but a negative effect during summer.

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