Pricing "Push Ups"

Current situation

From analyzing the mock catalog, the second-hand marketplace currently earns less than 0.3% of the total transaction value on the platform, as shown in Fig. 1.

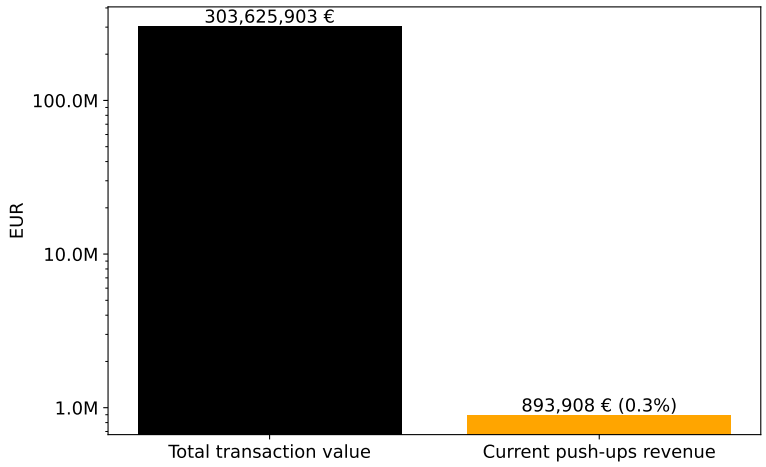

Figure 1: Total value of items sold on the platform (left) compared to revenue generated from push-up fees (right).

From the available data, there is a clear trend of **more push-ups when the relative expensiveness**[1] **is lower**. This trend is seen in Fig. 2: Items with lower relative expensiveness generate more revenue (they have a higher push-up conversion rate[2]).
Based on the trend in Fig. 2, I conclude that the price of the push-up is not optimized; it is too high for cheap items and too low for expensive ones. Therefore, there is room for improvement (see Section).

[1] **Relative expensiveness** is, throughout this report, defined as the price per push-up (currently 2€) divided by the average price of the item. For example, a relative expensiveness of 0.5 means the push-up costs half as much as the average item listed, which is not desirable.

[2] **Push-up conversion rate** is defined throughout this report as the number of push-ups bought divided by number of listings, per category.

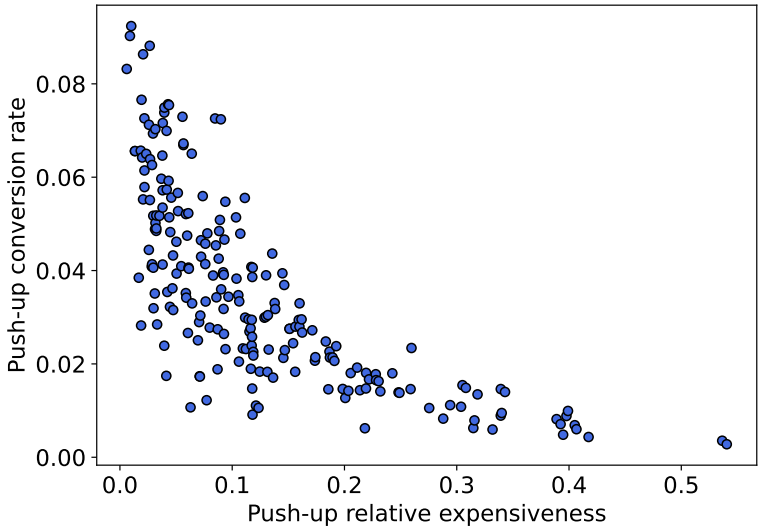

Figure 2: Relative expensiveness of a push-up vs. push up conversion rate. Listings that have relative expensiveness lower, tend to be more pushed-up.

Alternative strategy

An alternative is to introduce dynamic pricing based on the average listing price per category. In other words, the price of a push-up would be a percentage of the item's value.

Pros:

- Better price fit across categories: lower for cheap items, higher for expensive ones.
- More sellers encouraged to buy: Sellers of cheaper items might be more likely to use push-ups when the price feels reasonable (still having in mind that the amount of push-ups should not significantly increase).
- Potential for more revenue: Aligning price with item value is expected to lead to higher engagement and revenue.

Cons:

- Harder to test and analyze: Unlike a fixed price, this approach introduces more variables and adds complexity to A/B testing.
- Needs regular updates: Average prices may shift over time, requiring the model to be recalibrated.
- Does not capture all behavior: Although this model adjusts for item value, it does not account for human behavior, like bundling, which may influence willingness to buy push-ups.

I built a model that changes the price of push-ups, depending on the price of the item listed. The goal was to increase total push-up revenue by making prices more aligned with item value. I took into account that a change in price will change the amount of people buying push-ups. To do that, I did two things. First, I determined what is the change in push-up conversion rate as a function of the push-up relative expensiveness. This is shown in Fig. 3, where I show the model that best fits available data.

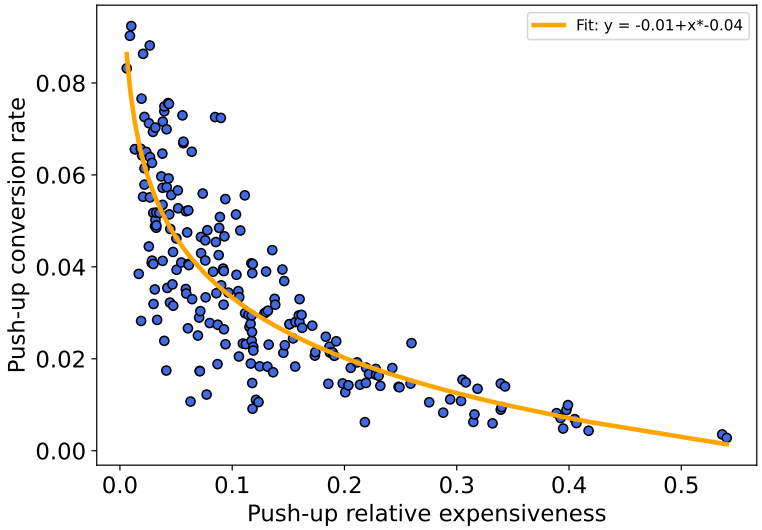

Figure 3: Change in push up conversion rate as a function of the push up relative expensiveness.

Second, using that model, I calculated the evolution of the total push-up revenue as a function of the push-up relative expensiveness. This is shown in Figure 4.
The model shows that the optimal price is around **21% of the item's price**.

Using this strategy, total push-up revenue would increase from 893,908€ to 1,229,015€, which is an increase of 37% of the current push-up revenue, as shown in Fig. 5).

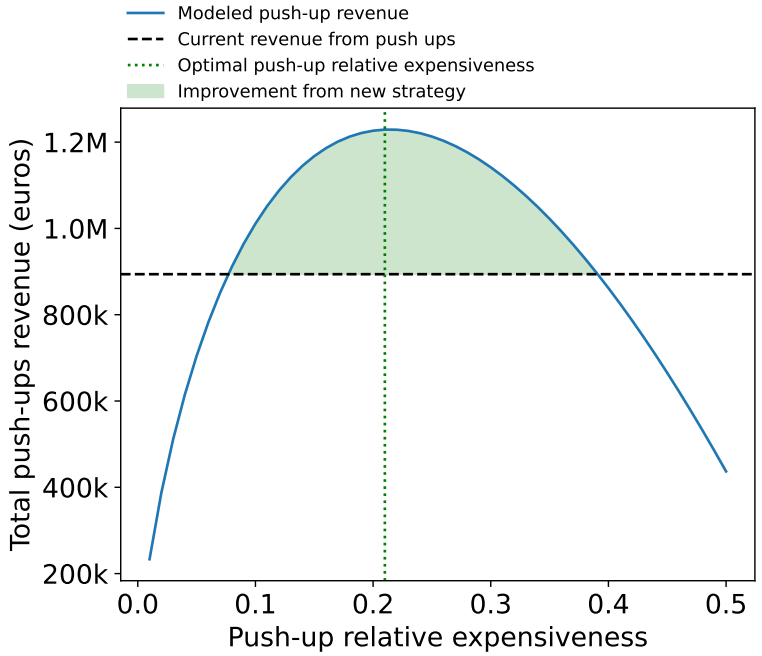

Figure 4: Evolution of the total push up revenue as a function of the push up relative expensiveness.

Risks:

- Too many push-ups reduce visibility: If too many sellers buy push-ups, they may lose their value, as not everyone can be at the top.

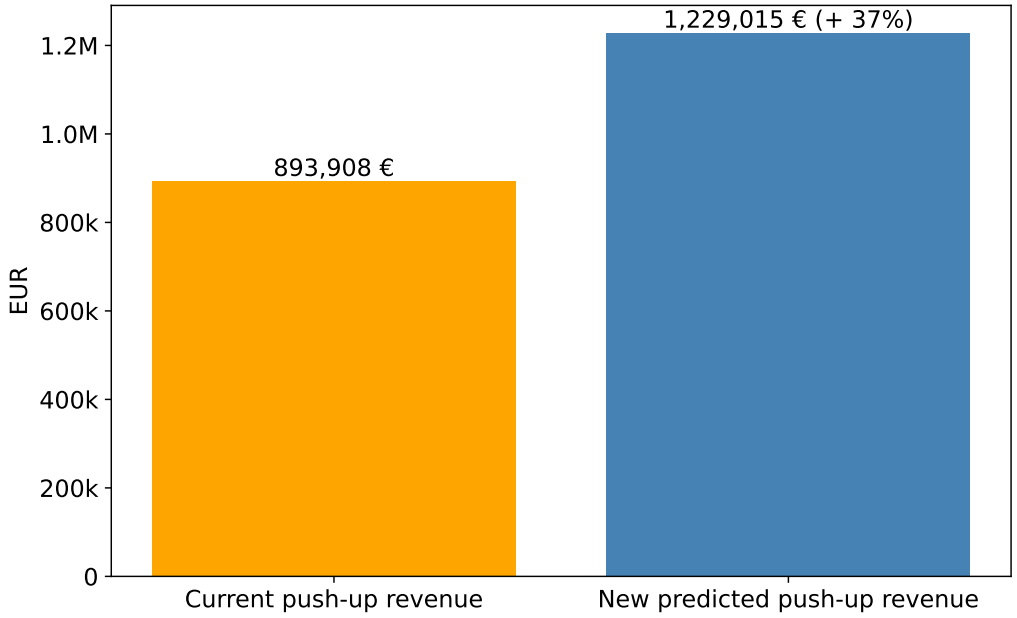

Figure 5: Histogram comparing current push-up revenue (orange) with predicted revenue under dynamic pricing (blue).

- Model simplifications: The model does not include all aspects of human behavior, such as bundling or seasonal effects, which may lead to pricing that is optimal in theory but not in practice.
- User confusion: If pricing changes dynamically, users may find it less transparent or harder to understand.
- Requires ongoing maintenance: Average prices and user behavior evolve, so the system would need regular monitoring and adjustments.