

**CHARLES UNIVERSITY**  
**FACULTY OF SOCIAL SCIENCES**

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**The influence of watching videogame streams on purchase  
decisions of gamers and their willingness to pay, evidence  
from the Czech Republic**

Bachelor's Thesis

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**Year of the defence:** 2021

## **Declaration**

1. I hereby declare that I have compiled this thesis using the listed literature and resources only.
2. I hereby declare that my thesis has not been used to gain any other academic title.
3. I fully agree to my work being used for study and scientific purposes.

In Prague on 22 July 2021

Veronika Mertová

## References

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## **Abstract**

This thesis aims to understand the relationship between viewership of video game streams and purchase decisions players make. Furthermore, the price they are willing to pay is explored. The emphasis is on understanding the difference in these effects for big blockbuster games and small independently developed titles. The data was collected using an online survey distributed in gaming-focused groups on social media. The data on purchase decisions was analysed using a logit model. It showed that trust in streamer's recommendations increases the chance of purchase along with the number of preferred genres and games bought for indie titles. Moreover, it showed a positive relationship between being a student and purchasing a big game after watching. A standard ordinary least squares model was used to analyze the price and showed that hardcore gamers, people who buy on release day, and people with a wider range of interest in games tend to pay more. On the other hand, older people, students, and people who prefer to buy games on sale are willing to pay less.

## **Keywords**

Video games, streaming, indie, AAA, willingness to pay, logit, Czech Republic

## **Title**

The influence of watching videogame streams on purchase decisions of gamers and their willingness to pay, evidence from the Czech Republic

## **Abstrakt**

Tato práce si klade za cíl porozumět vztahu mezi sledováním živých vysílání z videoher a následnými nákupními rozhodnutími hráčů. Dále je také zkoumána cena, kterou jsou hráči ochotni zaplatit. Důraz je kladen především na pochopení rozdílů mezi tím, jak tyto vztahy ovlivňují velkou populární produkci a jak malé nezávislé vývojáře. Sběr dat byl proveden formou online dotazníku distribuovaného přes herní skupiny na sociálních sítích. Pro analýzu dat o obchodních rozhodnutích byla použita logistická regrese. Ta ukázala, že důvěra v doporučení streamerů spolu s množstvím preferovaných herních žánrů a zakoupených her zvyšuje šanci na zakoupení menších titulů. Také se ukázalo, že je vyšší šance, že po sledování streamu si velkou hru zakoupí student. Metoda nejmenších čtverců byla použita pro analýzu ceny a ukázala, že hardcore hráči, lidé zvyklí kupovat hry v den vydání, a ti s širším rozsahem zájmu v oblasti her, jsou ochotni zaplatit více. Na druhou stranu, starší lidé, studenti, a hráči preferující nákupy ve slevách platívají méně.

## **Klíčová slova**

Videohry, streamování, nezávislé hry, AAA hry, ochota platit, logit, Česká republika

## **Název práce**

Vliv sledování videoherních streamů na nákupní rozhodnutí hráčů a jejich ochotu platit, data z České republiky

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## **Acronyms**

AAA	or 'triple-A,' meaning the largest scale of production in the gaming industry
CZK	Czech Koruna
OLS	Ordinary Least Squares
MLE	Maximum Likelihood Estimation
MMOs	Massively Multiplayer Online games
UGC	User-generated Content
WTP	Willingness to Pay

## Introduction

The videogame industry has been steadily growing in the last few decades, it has become the most dominant in the entertainment sector, and since the surge of the pandemic, it began to grow even faster. Therefore, the competition on the market is substantial, and it is becoming more and more difficult for the smaller firms to be visible among the industry's giants. Today, the video game market is dominated by a blockbuster (or AAA) scale production, the most prominent titles costing hundreds of millions of dollars and taking several years to produce. (VironIT, 2018)

However, due to the digital nature of the industry, relatively low barriers to entry, and a wide range of development tools becoming easily accessible, smaller and smaller firms or subjects, sometimes even individuals enter the market as game developers. They usually create smaller, shorter projects, but since the mass-market production rules do not limit them, they tend to come up with new, fresh ideas and highly original games. They are further helped by the companies running digital distribution platforms, like *Steam*, which provide a special section devoted to independent (indie) production. (Matar, 2013).

Furthermore, thanks to yet another surge in the entertainment sector, the live streaming, the opportunities for small developers to make themselves visible using the streams arose. The emergence of services like *YouTube* or *Twitch* allowed common people without any special equipment or a professional studio to broadcast the footage of the game they played accompanied by their commentary. (Záhora, 2014) Soon, these streams gained on popularity, and the numbers of both viewers and streamers grew rapidly.

The increasing popularity of video game broadcasts attracted large audiences. And since *Twitch* allows people to support their favourite content creators directly by money donations or regularly in the form of subscriptions, the most successful streamers could become professionals and earn real-world wages through streaming videogames. (Johnson and Woodcock, 2017) Inevitably, the game developers and publishers noticed and started entering contracts with the popular streamers, providing them with the free game for their stream or even paying them for playing it live.

Foster (2016) discovered that heavier gamers tend to believe a streamer's opinion more than those who play less. Setterstrom and Pearson (2017) focused on massively multiplayer games and found that consumer-brand identification, satisfaction with a game, and its reputation increase the willingness to pay. Hua-Jung and Yih-Chearng (2014) found that with *Facebook* games specifically, consumers are more willing to pay for challenging, interactive, and novelty games.

This work will focus on the effect watching video game live streams has on the purchase decisions of the players. The difference in the effect for the large AAA and independent production will be emphasised. The aim is to analyse the willingness to pay for AAA and indie games based on previously watching a stream of the given title. Furthermore, the prices gamers would be willing to pay for each category will be examined and analysed along with the optimal price from the developer's point of view. The data for this thesis were collected using a self-developed questionnaire distributed among gamers on social media websites. Besides the attitudes towards streamers and content creators, the respondents were asked about their gaming habits, the factors influencing their purchase decisions, and general demographic information.

As, to my knowledge, any similar analysis dealing with the willingness to pay after watching a stream has not yet been conducted. It might provide a useful insight into the purchase decisions of gamers, especially when comparing small developers with AAA ones. For instance, a small independent Czech developer, *Amanita design* stated at the *Prague gamedev panel* that providing keys to streamers and video producers does not affect the subsequent sales and, therefore, stopped providing keys. Hopefully, the study could help similar developers in identifying the factors influencing purchase decisions after watching streams and subsequently better target their audience.

The structure of the thesis is following. In chapter 1, the theoretical background concerning games and live streams is provided. Chapter 2 follows with a literature review for the various marketing methods in the videogame industry, the concept of willingness to pay, and a summary of previous research. Chapter 3 introduces the reader to the data and its structure, describes dependent and explanatory variables, and states hypotheses. In chapter 4, methods used for the analysis are introduced and describes. Regression results are then provided in chapter 5. And lastly, chapter 6 contains the conclusion to the thesis and its findings.

# 1 Background

## 1.1 Videogames as an economic sector

The video game industry has become very relevant in the last decade. It has grown to be the most dominant industry in the entertainment sector. According to Newzoo, a company specializing in analytics of the gaming industry, the industry's total market value in 2019 was \$146.2 billion (the Czech Republic's GDP was \$250.7 billion in 2019) and is estimated to grow to \$217.9 by 2023.

During 2020 the growth has been further accelerated by the pandemic. With people having to stay home and avoid public events, they turned to other means of entertainment and socializing with each other. Gaming showed to be a perfect substitute for interacting with friends and family members for many consumers.

The effect of the pandemic appears to be most significant for the console segment as the revenues for publicly traded companies grew almost 30% in the first half of 2020. The reason for the growth might be console's easy-to-use nature, making it more comfortable and less time-consuming for occasional and new players. In addition, consoles and console games also usually have higher marketing budgets than PC games (Wijman, 2020).

Casual gaming also saw its burst since people who usually do not categorize themselves as gamers started playing video games. Casual games can be described as games for a mass-market audience that do not require hours of training to play well. These games are simple to understand and played in shorter sessions, making them more accessible to non-gamers. These attributes make them perfect for smartphone and tablet gaming.

In 2020 mobile games alone accounted for almost 50% of the global gaming market. This is mainly due to mobile's low entry barriers and smartphone accessibility. Moreover, large portions of mobile games follow the free-to-play monetization model, allowing consumers to download and play the game for free and unlock additional content by payment (Clement, 2021).

## 1.2 The game industry in the Czech Republic

According to the Czech Game Developers Association, approximately 150 companies operate in the Czech gaming industry, including developers, publishers, and outsourcing firms. Among them, 110 meet the definition of a game developer. However, most of these companies (73%) are small teams with ten or fewer employees.

In 2019, 65 new games were released by the Czech companies. Because of their nature, video games are easy to distribute and an excellent export article. As a result, the export ratio of Czech games is 95%, the greatest importer being the USA.

Most developer companies in the Czech Republic are domestic companies, and only 9% are branches of foreign companies.

The turnover of the gaming industry in the Czech Republic has reached over 5 billion Czech korunas (almost \$250 000) in 2020, which is more than triple of what domestic movie productions generate. Between central and eastern European countries, the Czech Republic takes third place behind Poland and Romania. The industry has been steadily growing in the long term, with 29% rate reaching 68% jump in 2018. (GDA, 2020)

The growth can be expected to continue since the global pandemic did not hurt the industry. On the contrary, game sales have increased drastically with people staying at home and looking for leisure activities. (Statista, 2021)

According to Pavel Šebor (SCS Software), the profits of SCS have been growing since February 2020, reaching 750 million Czech korunas. In addition, Bohemia Interactive and Beat games have also reported having noticed an increase in sales of their games.

Most Czech developer companies have moved their production to the home office, leading to slower production and the emergence of hidden costs. (Forbes, 2021)

### **1.3 Video game streaming**

Video game streaming is becoming increasingly popular in the last few years. It allows viewers to watch games in which they are interested in real-time and from an independent source. This may be why many gamers turn to streams when they want to form an opinion about a particular game.

Arguably, the most popular streaming platform is Twitch, which reached 100 million unique viewers a month in 2015 and continued to grow (Needleman, 2015). According to *Twitch tracker*, the average number of concurrent viewers has been steadily growing since 2013, with the most significant step occurring from March to April 2020, marking the beginning of lockdowns throughout the globe. In April 2021, the average number of concurrent viewers was more than 3 million (Twitch tracker, 2021).

Twitch is not only a place to watch games; it also provides an opportunity for gamers to socialize and could be described as a social media platform for gamers. It is common for a streamer to broadcast the game with their commentary and face camera turned on. While broadcasting the game, they interact with their viewers using a chat window, creating a shared experience between them and the audience (Twitch, 2021).

Game streaming functions as entertainment for masses of viewers, which also benefits game developers and publishers. They might perceive streamers as promoters of their own brand and product. The streams and especially the popular ones, drive attention to the game and inadvertently advertise the product to the audience. (Walker, 2014)

## 2 Literature review

### 2.1 Marketing of videogames

Videogame development can be expensive. While small mobile or casual games developed by a single person and having uncomplicated mechanics (e.g., *Flappy bird*) may cost less than a thousand dollars, most games will cost significantly more to develop. Medium-sized games (e.g., *Hearthstone*) can cost several hundred thousand dollars, and the production cost of large "triple-A" titles can be as high as hundreds of millions of dollars. (VironIT, 2018)

Therefore, the companies need to be able to sell their product to the customers with efficiency. Most game sales come within a week of their release, and a good marketing strategy can significantly affect sales. Leading firms in the industry have a specialized PR and marketing team, while other developers may hire a marketing company or promote the game themselves using less demanding methods.

The videogame market is enormous, with hundreds of thousands of products for a customer to choose from. Therefore, a game's success might be determined by the effort and amount of money assigned to promoting the game. Successful indie developers might need to allocate somewhere between 10% and 50% of their budget to marketing. (Denby, 2019)

For larger companies, these percentages can rise substantially higher. *For example, Call of Duty Modern Warfare 2* cost around \$50 million to develop; however, another \$200 million had been spent on additional expenses, marketing being the most significant among them. (The Escapist, 2009)

Marketing a videogame demands both time and money, and both are often scarce for the developer. Therefore, developers may enter a contract with a publisher who helps with marketing and other development unrelated tasks and expenditures. After the release, they get a share of earnings. One of the largest publisher and development companies, *Electronic Arts*, has spent \$689 million in the fiscal year 2021 solely on sales and marketing. Global video games advertising spending has been steadily growing during the last decade, and from being around \$1.4 billion in 2010, it has reached over \$5 billion in 2020. (Statista, 2021)

These contracts tend to be profitable not only for the developer but the publisher as well. In 2010 a game called *Heavy Rain* was released, developed by *Quantic Dream*, and published by *Sony*. *Sony* spent around \$40 million for the game, \$17 million of that for the development itself; the rest went to marketing and distribution. However, the sales of the game brought more than \$100 million to *Sony* itself. (Eurogamer, 2013)

### 2.2 Types of marketing used for video games

Due to their digital and easy-to-access nature, videogames can benefit from many forms of advertising, varying from television advertisements and billboards to online communities where the word about their product can spread uncontrollably. There are also marketing tools provided by the distribution channels and sellers of the games developers can use to make their product more visible. (Mathews, 2016)

Marketing of digital games uses information about the game and game content predominantly. Work in progress, design decisions, and current information about the state of development can

be used as potential promotional material, including screenshots, concept arts, gameplay, or in-engine video.

In the following section, several marketing methods used by the game companies will be mentioned and explained as well as their advantages and disadvantages for the firms of different sizes.

### **2.2.1 Commercials**

As mentioned above, due to high production prices, only the largest firms in the videogame industry have enough resources to be able to afford a full range of typical marketing tools, including television advertisements, setting up billboards, creating and distributing video game merchandise and promotional items or taking advantage of video advertising on various websites.

Although this is a highly costly method, it has the best potential to reach a huge number of potential customers, including those with only marginal interest in playing games. As the most prominent development companies usually target their product for the mainstream audience, reaching as many people as possible is desirable. On the other hand, small businesses can not afford these types of promotion, nor do they need it, as their products tend to be targeted more toward a specific group of gamers. Because of these limitations, only a few releases each year are promoted this way.

### **2.2.2 Press**

Usually, the first step in promoting the game is to establish contact with the press. Due to the global nature of game journalism, even local developers may face worldwide competition. Traditional press conferences might not be as effective because thousands of games are being developed simultaneously, and the information can easily be lost. Direct communication with the press is one of the first available tools to creating a fanbase around the new title even before its release. For the small and indie developers, this step is crucial. As their resources are limited, every article or interview published is valuable to them. However, the game must impress with a trailer, gameplay footage, or even a playable teaser. (Záhora, 2014)

The developers should make an effort to deliver well-arranged information to the press. That can help the journalists process the information more easily and prevent them from researching all the information about the product. Developer companies use a so-called press kit, a website, or a file containing all the crucial basic information about the game. (Gamasutra, 2017)

The game's unique selling points should also be mentioned because they help to distinguish the product from its competition and reach the target audience.

*"Cyberpunk 2077 is an open-world, action-adventure story set in Night City, a megalopolis obsessed with power, glamour, and body modification. You play as V, a mercenary outlaw going after a one-of-a-kind implant that is the key to immortality. You can customize your character's cyberware, skillset and playstyle, and explore a vast city where the choices you make shape the story and the world around you."* (Official web of Cyberpunk 2077, 2021)

In this specific case, the selling points would be:

- open-world
- action-adventure
- customizable character

- choices matter

Communicating with the press is crucial for both large and established firms and small and independent developers. So no matter the size, all companies should take special care when creating and delivering their press kits.

### **2.2.3 Conferences**

As in any other industry, gaming conferences are mainly used by developers and publishers as well as hardware manufacturers to introduce and promote the new project to the press and public. Conference types vary from industry only and completely closed to the public to those aiming specifically at the final customer.

One of the most famous conferences with visitors from all around the world is the *Electronic Entertainment Expo* (hereinafter *E3*). Many members of the gaming community consider it to be the peak of the gaming season. Up to 2017, it has been an industry-only event. Since then, however, it has been gradually evolving to become more consumer-oriented. With these changes, some of the industry's leading firms and celebrities decided to leave the conference and move toward organizing their own show. (VentureBeat, 2018)

Due to the COVID-19 pandemic, most planned conferences for 2020 have been canceled or moved to the online environment, *E3* among them. (Variety, 2020) Leading to a significant change in the industry's and public's perception of the conferences. It was no longer necessary for the press and other attendants to travel to the place of the event as the conferences were held online and accessible to anyone. Among other things, it meant that companies did not have to pay rent for the conference stages and could take longer in presenting, giving enough space to smaller projects. For example, the *Koch media* conference took over two hours instead of the standard time of less than one hour. (YouTube, 2021)

In non-pandemic times, conferences provide an excellent opportunity for both large and smaller firms to introduce and present their work. Although "triple-A" titles get more attention and better time slots, smaller games are not overlooked. Moreover, with every project having its presentation booth in the venue, even indie developers get a fair chance to earn the attention of the press.

### **2.2.4 Distribution platforms and cooperation with the seller**

Apart from the tools mentioned above, developers are free to use a number of marketing tools provided by the platform on which the game is distributed or a store that sells physical copies of the product. Marketing tools provided by the platform *Steam* will be listed and described as most platforms generally provide similar services.

Each game available on *Steam* has its own product page on which all important information about the game is visible and easy to find. *Valve* (a company owning and operating *Steam*) then provides developers or publishers with tools and instructions on how to make their product page more visible among others or reach the target audience directly. Moreover, *Steam* provides detailed marketing guidelines intended to help smaller or starting developers.

According to *Steam* guidelines, there are three stages of development, each needing a different type of marketing provided by their platform. In this section, all stages will be mentioned, along with some marketing tools associated with them.

#### 2.2.4.1 Pre-release

The first step *Steam* recommends is to set up the product page as early as possible so that players have enough time to spot the game, wishlist it, and follow the updates. It is essential to catch the attention of potential customers fast; therefore, the product page should include easy to interpret, clear and to the point information about the title, ideally with screenshots or a short gameplay video. By wishlisting the game, a *Steam* user opts to receive news, updates, and promotional information about it. They will also receive an email with the release date and when the game is on sale.

*Steam* allows developers to add tags to their store page. They represent the game's essential features, such as whether it has multiplayer, controller support, achievements, and similar. It also states the game genre, gameplay, or art style. The tagging system helps the *Steam* recommendation engine target potential buyers based on their preferences and provide information to players about what the game is like. Users might also choose to search the store using tags rather than looking for a specific title.

During the development, an announcement system can be used in order to keep the customers up with the newest updates. It can also serve as a form of community channel where the game's artwork or descriptions of new features can be shared.

Video games can be considered a global product, but many players worldwide do not speak English. Therefore, *Steam* recommends developers to focus on localization as the games with more supported languages will be recommended to the players speaking that language. This mainly concerns the Asian market because most Western players speak English as their first or second language. Having at least Chinese localization can, however, have a significant effect on the profits.

If a developer wishes to do so, they can allow users to play their game in so-called "early access" before it is finished and released. This approach will engage the community in testing the game. The participants will be asked to provide feedback on the development progress and report potential problems. *Steam* provides the infrastructure to create and distribute test builds comfortably and relatively safely (without the risk of undesirable leaks of the content) through the usage of license keys.

Similar to providing "early access," *Steam* also allows smooth distribution of review copies to the press, streamers, or influencers. It has become quite common in the industry to provide review keys a few days prior to release as it helps raise awareness of the upcoming title and gives reviewers enough time to play through the whole game and come up with an evaluation on the release date.

When the game is nearing its release and has been labeled as "coming soon," it is placed on the list of all upcoming titles ordered by the release date. It can appear in other lists as well if the recommendation system, based on the game tags, determines specific users might be interested.

The last recommendation *Steam* gives before the release is to create a developer or publisher homepage and to link the corresponding game to it. If a user then decides to follow a company, they will be alerted to any other project by that subject.

#### 2.2.4.2 Release day

Similar to other platforms (like YouTube or Twitch), Steam allows to set up a live stream of a game. It can be streamed by the developer itself, members of the team, or community members. Streaming is a helpful way of showcasing the game's visuals, mechanics, and overall design. More about streams will be mentioned later in the thesis.

As every Steam user has to be registered and signed in to use the service, they can receive promotional emails automatically based on the state of development or release process. For example, Steam will send an email that a game has been released to every user that has wishlisted it. Another notice is sent when a discount on a game is offered or a new update is released.

As new titles are being released, they are placed in the queue of new releases and, therefore, become more visible at the launch time. Once the game is available for sale, it also qualifies to be recommended to other players based on their preferences and the game's tags.

#### 2.2.4.3 After release

Although most copies of any game are sold within two weeks of its release, it is still relevant for a developer or a publisher to promote the game further. One of the ways to stand out is to discount the product, as it triggers email notifications and makes the game show up more in the store.

Keeping the game updated and functional and adding new content can significantly prolong the game's life cycle and keep it relevant indefinitely. The new content can be in the form of free updates or more extensive paid expansions, so-called DLCs (downloadable content). The great examples of this approach are the popular Czech games *Euro Truck Simulator 2* and *American Truck Simulator*, both developed by *SCS Software*. According to the Steam product page of *Euro Truck Simulator 2*, developers have created and released over 70 DLCs, some adding new vehicles or cargo types, others only small cosmetic items. However, eight of them are so-called map expansions that bring new areas and hundreds of kilometers of roads for the players to roam (Steam, 2021). Even though *Euro Truck Simulator 2* has been released in 2012, thanks to this special care of the developers, it is still among the top 30 most played games on Steam with 20 thousand concurrent players on average. (Steam Charts, 2021)

### 2.2.5 Own channels, social networks, and community marketing

The game industry companies' most accessible marketing method is community marketing. It involves creating and maintaining a brand presence and interacting with a community of existing and already engaged customers. Companies can access and use various communication channels, most commonly those, which give members space to express their needs and provide feedback to the developers (e.g., Facebook, Twitter, online forums). Community marketing differs from other types by focusing on the relationship with the customers the brand already has, rather than just adding new ones.

People form communities by nature. They are engaged around various topics concerning their interests, hobbies, professions, or information needs. Communities are formed when members build a relationship with each other either directly or indirectly. An online community is then a gathering of people on the internet, all working toward a common goal. Nowadays, developer companies aim to create communities on open social media websites like *Twitter*, *Facebook*,

or *Instagram* and add community properties to their own space like official websites, blogs, or forums.

Using community platforms, companies can identify their fans and potential customers and provide them with tools to interact and communicate with each other and the company. That forms a basis for an online community. Today's social networks and technologies associated with them allow marketers to build a relationship and trust with the players, which helps them target specific groups and allows community members to participate in the development process. Developers receive feedback and ideas from the members, and in turn, this makes the members feel important for the development process, which they are.

There are significant advantages to utilizing community marketing. Firstly, customers who seek aid or support would visit the websites, where another community member or a developer will provide information, guidance and feedback regarding the product. Members can share their experiences, problems, or opinions, whether positive or negative. This might contribute to spreading word-of-mouth, as players are sharing information and learning from each other. A developer's involvement is necessary, but a community allows them to answer questions and give information to all at once, leading to a more efficient information flow.

Secondly, when people help each other by providing tips and helpful information, they feel a sense of accomplishment and satisfaction. Because people are helping others, they are appreciated and are heard. This leads to a healthy community that, in turn, creates loyal customers.

Thirdly, thanks to the customer feedback and ideas, developers are able to improve their products or even catch a mistake they would otherwise overlook. Companies can also see exactly how and by whom their games are being played, which leads to adding new features or removing unentertaining ones. Both of these contribute to helping developers target their products better.

Lastly, when a customer becomes involved with a brand by contributing information, they gain a good reputation within the community. The developer company might then reward this participant with unique benefits, increasing their loyalty to the brand.

Of course, there are also drawbacks to using this type of marketing. If a community is created on an open social network like *Facebook* or *Twitter*, involvement from a non-buyer may occur. That leaves a threat of them posting a false opinion or damaging brand name differently. Therefore, community managers need to pay close attention in order to be able to remove such postings.

Moreover, negative comments or reviews tend to have a much more significant impact on brand popularity than positive ones. Therefore, it is essential for the developers to respond quickly to each negative comment to restrict the effect. (Baxi, Panda and Karani, 2016)

### **2.2.6 Participation marketing**

From the previous section, it is quite clear that players or users can be a powerful force when marketing a video game. As they create new content and share it with each other, they inspire others to do the same. This can, in fact, lead to a situation in which the consumers, rather than paid professionals, become the promoters of a specific brand, title, or product. Companies can promote and encourage this behavior and guide their customers to create brand-related content,

spread it further, and then use it as their own marketing. The approach of using user-generated content for the purpose of own brand marketing and image creation has become known as participation marketing. (Poch and Martin, 2015)

Research suggests that people involved with generating content are more likely to become advocates of the brand. Their opinions can be considered more trustworthy by the community than if they were just consumers (Schivinski and Dabrowski, 2016). Other research found that engagement with a brand affects the purchase behaviors of consumers. While user-generated content uses both informative and persuasive techniques, professional content primarily uses persuasive ones. It was found that user-generated content can be 22 times more persuasive. However, since both approaches affect consumers differently, the firms need to balance them properly. (Goh, Heng and Lin, 2013)

According to Leboff, companies should actively try to support user-generated content and involve customers creatively to encourage them to generate value added to the product. Because allowing it can lead to a much better targeted product than it would otherwise be. (Leboff, 2011) In gaming, there are various forms of engagement. Some of them are created by developers to allow players to participate easily. Others are created by the communities themselves when consumers decide they want to create additional content without any encouragement simply because they like the product.

One of the first steps developers can take to engage customers with creative activity is including in-game customization. It can be as simple as changing the look of the player's character, choosing names for characters and places, customizing the game's UI, or slightly changing the color palette. In-game customization options can, however, be much more complex. There are games specializing in high customizability, where players can build family houses, ZOOs, theme parks, city complexes, space stations, and much more from scratch. These games then offer players a possibility to save "blueprints" of their creations and share them with others. Historically, one of the most popular games of this type is *The Sims*. It is estimated that approximately 90% of this game is customizable by the player. (Hofman-Kohlmeyer, 2021)

In recent years, several games focused solely on player creativity were released. *Dreams* developed by *Media Molecule* is in its nature a game creation system. Players can create smaller games, mechanics, models, animations, and much more within *Dreams*. Other players then have access to these creations and are free to use or remix them any way they want. Using the game as a tool, players created hundreds of projects; some of them were inspired by other games and therefore acted as user-generated content for these titles. (Dreams, 2020)

Even if the games are not primarily focused on creativity, developers can provide players with tools to modify their products. Talented players can then act as programmers and producers of additional game content, so-called "mods." Mods can include but are not limited to new maps, models, game mechanics, translations, or stories. When an ambitious modding project arises, many modders work together and help each other to bring it forth. Most modders state that they mod for fun and want to improve the games for the player rather than help the developers. (Poor, 2014) Modding communities are invaluable to the developers and can be provided with help from the developer, like additional tools or discussion forums.

Some mods even reached such popularity that they became standalone games. The most famous example of this is a user-created map to *Warcraft 3*, called *Defenders of the Ancients* (DotA),

which led to creating a new game genre MOBA (Multiplayer Online Battle Arena). In 2009, the map's creator was employed by *Valve* to help with work on *Dota 2*. (gameinformer, 2010)

In the last decade, video game streaming has become one of the most popular forms of user-generated content. It is a live broadcast of someone playing a video game, often accompanied by their commentary. Even though the largest professional streamers have a broadcast studio, it is certainly not necessary, as most streamers can do with just a personal computer, dedicated software, and a camera. Most of the streamers are players themselves and are not associated with the developers in any way, although developers can stream their own game, too. (Záhora, 2014)

The most popular streaming services are *Twitch* and *YouTube*, with *YouTube* being older and primarily dedicated to sharing pre-recorded videos. However, many professional streamers began their career there and then transitioned to *Twitch*. Professionals in the streaming world receive their income directly from the viewers in the form of voluntary donations or periodic payments from subscribers. Streaming has become a highly competitive field, and many streamers have to work hard and regularly in order to keep their audience interested. For them, it is an equivalent of a full-time job, as they can spend dozens of hours a week streaming. (Johnson and Woodcock, 2017)

With streaming becoming popular and moving to professional levels, developers started to notice and enter business contracts with the streamers. The contracts can usually involve paying for playing and promoting a specific game or simply providing a streamer with free products, including games, merchandise, or special promotion packages. This can be particularly beneficial to smaller or independent game developers, as they can provide game codes to the streamers and therefore become much more visible, especially if they manage to connect with a popular streamer.

There are various types of streams; each focused on different activity and engagement level. The most prominent ones being eSpors, let's plays, and speedruns. ESport streams are focused on highly competitive tournaments and matches in online games. They often have the highest production value as eSport events tend to have a similar level of care as regular sports events, including professional commentators, game experts, a moderator in a studio, or prize money for the contestants.

In speedruns, streamers attempt to complete a game as fast as possible. It is a form of challenge that requires hours of preparation, training, and concentration. Speedrun streamers often exploit a game's bugs in order to skip large portions of it. Finding these exploits is a difficult task, and speedrun communities tend to come together in an effort to discover them. Streaming a speedrun can then, in a sense, become a guide to other speedrunners who try to get better in a specific game.

The most casual and probably also the most popular form of streaming are so-called let's plays. In contrast to eSports and speedruns, let's plays are not focused on competitive play or a particular player's skill. They usually provide enjoyment and information, and the audience comes mainly to watch the specific player. The success of a let's play broadcaster is mainly given by their personality and ability to entertain and keep their audience, rather than skill in the game. (Smith, Obrist and Wright, 2013)

According to research, people watch video games streams for various reasons. Their motives include entertainment, socializing with others or the streamer, learning about the game. (Cheung and Huang, 2011) Another research states that video gaming habits positively correlate with the perceived credibility of user-generated content. People who identify themselves as more hardcore gamers are more likely to believe in a streamer, influencer, or other community members than the traditional marketing methods. It was also shown that players who identify with a streamer's personality and behavior consider that streamer to be more credible than others. Being familiar with a specific stream or having previously viewed it leads to increased credibility of the given streamer as well. (Foster, 2016) These findings show that user-generated content, including streams, can influence gamers' purchase decisions.

Other popular types of user-generated content are, for instance, screenshots, written stories, paintings, various forms of videos, or cosplay (creating costumes based on a game's fashion).

### **2.3 Types of gamers**

From the marketing point of view, it is important to recognize and distinguish different types of gamers in order to target the right audience, as each player has their preferences. One of the most common ways, used even among gamers themselves, is distinguishing between hardcore and casual gamer. The two groups can be distinguished by their knowledge of the game, attitudes, playing habits, and purchase decisions.

Casual games tend to be easy to learn and require minimum time and effort. They can be played in small amounts of time while, for example, on a break or waiting for a bus (Tuten and Solomon, 2015). The most typical examples of casual games are mobile titles like the popular *Candy Crush Saga*. The *Nintendo* systems are generally considered to be gaming platforms intended mainly for casual players. On the other hand, hardcore gamers tend to spend many hours gaming, have higher skill levels, and are much more immersed in the game. Hardcore gamers are more likely to find satisfaction and exhilaration in beating the game, discussing games with other players, and forming communities. (Loporcaro, Ortega and Egnoto, 2014)

There are, of course, games and gamers that can not be considered casual nor hardcore and place simply somewhere in between. Some otherwise typical casual gamers also tend to spend long hours gaming, which is mainly a hardcore gamer's approach. Furthermore, casual games in some cases allow for a hardcore experience with higher difficulty settings, for example, "Expert" and "Expert +" difficulties in a popular Czech game for virtual reality *Beat Saber*. Modern games from larger studios can also allow players to choose the difficulty level and approach to the game (Juul, 2010). That includes games like *The Witcher 3* or *Red Dead Redemption 2*.

However, the player's preferences are not solely based on how complex, challenging, and time demanding a game is. Other factors and game characteristics play a role, too. Players have different preferences of the game genre, controls, art style, storytelling, or setting (sci-fi, fantasy, historical). Moreover, each player has a different goal, play style, or activity that they like to do.

According to Richard Bartle, a game researcher in MMO (massively multiplayer online) game industry, players can be divided into four groups based on in-game motivation. An achiever tries to overcome the challenges a game poses and achieve as many successes as possible.

Nowadays, game companies add so-called "Achievements" or "Trophies" (rewards for completing specific challenges) to their games in order to draw the attention of these types of players. Explorers find delight in discovering the game's world, mechanics, story and need to see and explore everything that draws their attention. Socializers use games as a medium to get to know other people or hang out with them. The social aspect of a given game is the most important to them. Killers, on the other hand, find satisfaction in imposing in-game superiority to others and disrupting their progress. (Bartle, 1996)

Distinguishing between different types of players can help developers target their marketing correctly, given that they are aware of which parts of their game will suit which players.

## **2.4 Willingness to pay**

### **2.4.1 Concept**

First proposed by Ciriacy-Wantrup (1947), willingness to pay (WTP) can be described as the maximum amount of money a consumer would be willing to spend in order to purchase a good or service. In contrast to the price a consumer actually pays, WTP captures the excess over the paid price. (Ciriacy-Wantrup, 1947) In other words, WTP, or reservation price, denotes the monetary amount that makes a consumer indifferent between purchasing a good or passing it and keeping the money. For the companies, WPT is essential in estimating demand and setting their price. (Wertenbroch & Skiera, 2002)

Mispricing a product can cause a firm not to fulfill its profit potential, and understanding consumers' WTP can help set the price correctly. However, firms tend to set prices of their products "intuitively," surprisingly, this is not limited only to retail firms where markups are still the predominant pricing strategy. (Levy et al., 2004)

### **2.4.2 Methods**

There are several ways to approach the classification of WTP. They can be differentiated either by how the data were collected or how dependably they capture the consumer's true WTP. In this section, the main methods of measuring WTP, as reviewed by Breidert et al. (2006), will be introduced.

#### **2.4.2.1 Revealed preference**

Revealed preferences are collected either by experiments or customer's actual responses to market prices. These methods can be costly due to the need to introduce potentially inaccurate prices to the market or provide incentives for the participants in the case of experiments. Therefore, they are rarely used in practice.

Sales data analysis can be used to estimate the price-response function. The data can come either from the sales records of retail stores or be reported by the customer panel members. This method can be problematic as it provides only historical data that may not contain necessary price variations. Using this method, it is also impossible to estimate WTP for new products.

In the case of experiments, auctions are the most common type. They can be held both in a laboratory and in the field. In a Vickrey auction, bids are secretly submitted, and the highest bidder wins, paying the second-highest bid price. The dominant strategy for this type of auction is to bid the true value. However, a problem of overbidding may occur, since as participants want to win, they may strategically place bids above their true WTP. (Kagel et al., 1987)

Another popular method is the so-called BDM procedure developed by Becker, DeGroot, and Marshak. (Becker et al., 1964) Bidders place their bids simultaneously. Then a price is randomly drawn from the distribution of prices that ranges from zero to the anticipated highest bid. Everyone bidding above the drawn price wins and pays that price. According to Wertenbroch and Skiera (2002), BDM may not suffer from overbidding as Vickrey auction does. However, under the BDM mechanism, people tend to converge to optimal strategy more slowly, and therefore, Vickrey is considered superior in use for private goods. (Noussair et al. 2004)

Lastly, the reverse-pricing method can be used. Under this method, participants name the price they are willing to pay. These prices are then compared to the threshold set by the seller. Everyone above the threshold price can buy the goods for the price they offered. However, this approach may incentivize the bidders to lower their amount in order to get a better deal.

#### 2.4.2.2 Stated preference

Stated preference methods are based on collecting customer survey data. Researchers can ask about the price either directly or indirectly, each approach providing different reliability.

While asking respondents for their WTP directly is probably the easiest way, it has several drawbacks. It draws too much attention towards the price, the customers may not have an incentive to report true values, or they might misjudge. Therefore, it might lead to undependable estimates of WTP.

Indirect surveys provide respondents with a possibility to reveal their WTP in the form of ranking, choosing from alternatives, or preference ordering. Several methods were created based on this idea.

In conjoint analysis, respondents are asked to choose from a combination of a limited number of alternatives in order to determine which combination is the most influential on consumer choice. This approach helps reveal consumer preferences through ranking. (Braidert et al. 2006)

Another approach is contingent valuation, which asks respondents repeatedly whether they would buy goods at a given price (close-ended) or state the price they would pay for the entire good or for attribute-level changes. (Wertenbroch & Skiera 2002)

## 2.5 Previous research

In this section, previous research focused on games, the influence of streamers, gamers' purchase decisions, and their willingness to pay will be summarized. Works related to online content and the internet, in general, will be mentioned alongside the gaming ones as the topics are close. Despite the increasing popularity of gaming, especially in later years, only a limited number of game-related works are available.

Research done by Foster (2016) attempted to evaluate the effectiveness of streams as a marketing tool. A survey was designed to measure participants' gaming habits and the perceived usefulness and credibility of the content. Participants were assigned to watch either developer-generated or user-generated stream. It was found that people with heavier gaming habits tend to trust user-generated content more than people who spend less time playing. Furthermore, it suggested that group identification and stream familiarity also have positive effects on the perceived credibility of user-generated content.

Hua-Jung and Yih-Chearn (2014) focused on *Facebook* gaming specifically. They focused on how various factors influence flow experience. They found that interactivity, challenge, and novelty a game provides positively affect the flow experience and could be further enhanced by difficulty and originality. They stated that players who experience a certain level of flow in a game might see it more worth purchasing.

Setterstrom and Pearson (2017) focused on massively multiplayer online games (MMOGs). Their main goal was to determine the effect of social influence on consumer's WTP. They posted survey links to the games' message boards and collected data directly from the targeted players. Data were then analysed using partial least squares. Results showed that consumer-brand identification has a significant positive effect on WTP while social identity complexity (belonging to several overlapping social groups) has a significant negative one. A year later, Setterstrom and Pearson, along with Guggenheim (2018), expanded upon their research and focused on other social factors that might influence WTP for MMOs. Results suggest that both satisfaction with the game and the game's reputation have a significant positive effect on WTP.

Another research focused on children and their preferences. Jennings and Messer (2019) conducted an experiment targeting children aged 6 to 16. The main goal was to find their preferences for playing games on mobile and WTP for the possibility to change player character. It was found that they prefer to play as a character of the same gender but are not likely to pay for gender change if it is behind a paywall. Most children also believe that both female and male avatars should be available for free.

Considering research in the Czech Republic, Vala (2015) focused on WTP for online news and found several factors affecting WTP. They were gender, occupation, internet usage, and previous payments. Strnadová (2019) then conducted research exploring WTP for streaming services. She found that a preference for original sound, previous online payment, number of used devices, cinema visits, and a desire to be mobile while watching had a significant positive effect on purchase probability. In contrast, preference for domestic movies, satisfaction with standard broadcasts, and preferring movies to shows had a significant negative effect.

## **3 Data**

### **3.1 Data collection**

The data collection was conducted using an online questionnaire. As mentioned in section 2.4.2.2, it is common to collect data on willingness to pay and consumer preferences. It was suited for this work because of its ease of use and no associated costs. The survey language was Czech as the research focuses on the player base in the Czech Republic; its full version and its English translation can be seen in appendices.

The survey was distributed among gaming-focused groups on social media and was available for completion from July 7<sup>th</sup> to July 13<sup>th</sup>, 2021. It consisted of 23 mandatory questions and took between three to five minutes to complete. Most answers were complete because of including only mandatory questions, even though a few consisted of "I will not tell" and "---" answers. A total of 1020 responses were collected.

Certain problems might arise when collecting self-reported questionnaire data. The first is limited reach to respondents as only people on social media can answer, leading to an unrepresentative sample. However, as the research is focused on gamers who are generally present on the internet, the effect of this problem can be expected to be minimal. Secondly, a self-selection bias may occur, as people were able to choose whether to complete the survey or not.

### **3.2 Data description**

In total, 1020 of responses were collected. After the collection, a cleaning process followed during which certain answers were removed due to their incomplete nature or lack of credibility, leaving a sample of 990 respondents.

A large portion of the sample, almost 90%, consisted of men, which might seem suspicious since, according to Statista, almost 40% of gamers today are women. (Statista, 2017) However, as most women tend to play more casual games, mainly on mobile, and the survey was distributed through dedicated gaming social media groups and focused mainly on console and PC gaming, the proportion seems reasonable. The average age of respondents is a little over 25 years, with the median value being 24 years, the age ranged from 10 to 56 years. The complete distribution of age can be seen in graph 3.1. In terms of education levels, around a quarter of respondents stated that their highest level of education was primary, mainly because they were high school students. More than half of respondents stated high school as their level of education, almost 8% reported undergraduate and 13% university degree. Almost 38% of respondents reported to be students, self-employed and employed together made up 59%, with the last 3% being unemployed and retired respondents. Income corresponds to the occupation since 40% of respondents reported income of 20 thousand CZK or lower. Other income groups were almost evenly distributed, with each group represented 12% to 15%, except people earning

35 to 40 thousand CZK with 5%. The detailed summary of demography can be seen in table 3.1.

Graph 3.1: Histogram of age

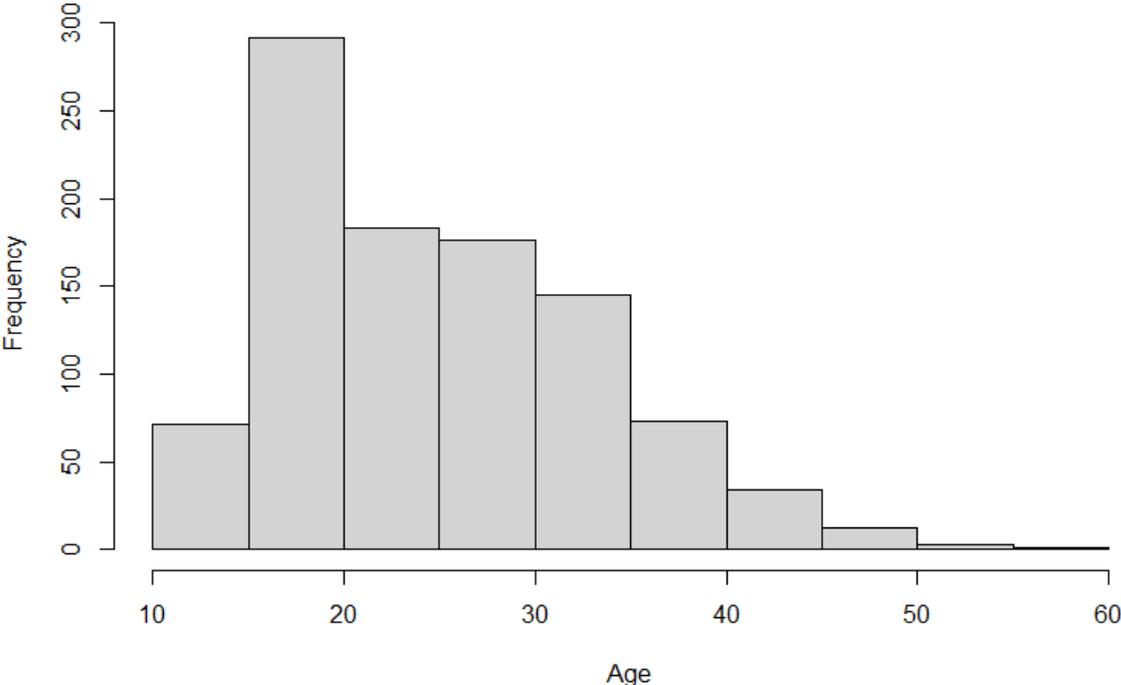


Table 3.1: Demographic information

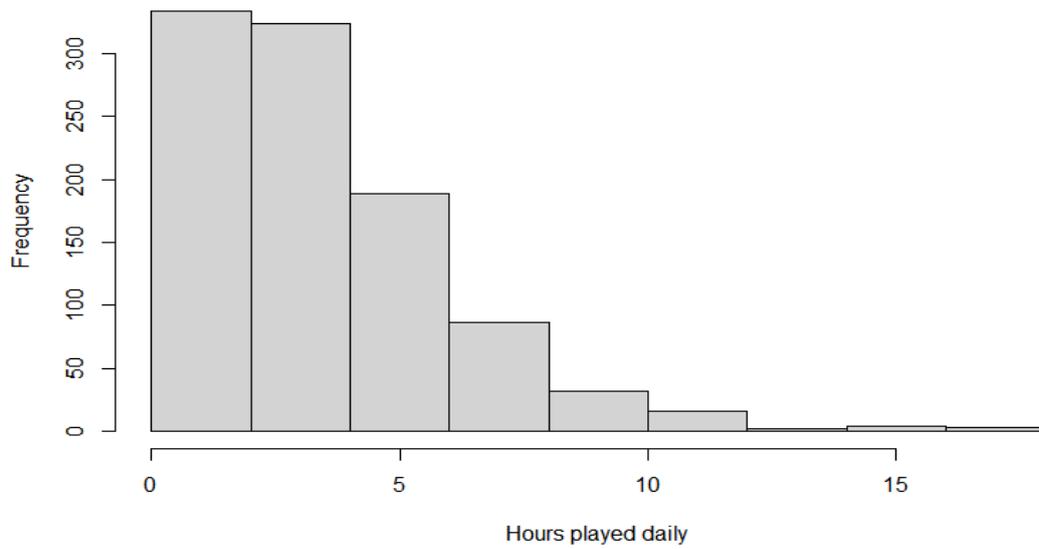
Variable	Frequency	Percentage
<b>Gender</b>		
Female	107	10,81%
Male	883	89,19%
<b>Age</b>		
10 – 19	319	32,22%
20 – 29	367	37,07%
30 – 39	241	24,34%
40 – 49	55	5,56%
50 +	8	0,81%
<b>Education</b>		
Primary	250	25,25%
High school	538	54,34%
Undergraduate	77	7,78%
University	125	12,63%
<b>Occupation</b>		
Student	375	37,88%
Employed	554	55,96%
Self employed	32	3,23%
Retired	10	1,01%
Unemployed	19	1,92%
<b>Income (thousands of CZK)</b>		
less than 20	397	40,10%
20 to 25	149	15,05%
25 to 30	135	13,64%
30 to 35	121	12,22%
35 to 40	55	5,56%
more than 40	133	13,43%

Moving toward gaming-related information, the first section of the questionnaire asked respondents about their gaming preferences. It revealed that 38% of respondents consider themselves casual gamers, 46% are somewhere between, and 16% identify as hardcore. Considering gaming platforms, 32% of respondents use only one, 34% use two, and 34% use three or more. The most popular platform is PC, with 70% of respondents using it, followed by mobile 44% and Playstation 41%. The most popular game genre turned out to be action games, which were reported to be played by 77% of respondents; the second most popular were RPG games with 68% of players. However, most gamers tend to enjoy more genres, as only 12% reported to play only one, 26% plays two, 32% plays three, and 30% four or more. A more detailed summary of gamer's preferences is presented in table 3.2. On average, respondents reported spending 4 hours a day gaming; the median value is 3. See table 3.2 for a histogram of hours played daily.

Table 3.2: Gamer preferences

<b>Variable</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Type of gamer</b>		
Casual	380	38,38%
In between	451	45,56%
Hardcore	159	16,06%
<b>Number of platforms used</b>		
1	320	32,32%
2	336	33,94%
3	260	26,26%
4	60	6,06%
5	14	1,41%
<b>Platforms</b>		
PC	700	70,71%
PlayStation	409	41,31%
Xbox	316	31,92%
Nintendo	221	22,32%
Mobile	431	43,54%
<b>Number of genres played</b>		
1	119	12,02%
2	262	26,46%
3	315	31,82%
4	188	18,99%
5	69	6,97%
6	37	3,74%
<b>Genres</b>		
Action	759	76,67%
Adventure	457	46,16%
RPG	673	67,98%
Strategy	376	37,98%
Simulators	392	39,60%
Sports	220	22,22%
Survival	12	1,21%

Graph 3.2: Hours spent gaming



The second section of the questionnaire focused on stream viewership. It was revealed that the majority of respondents, specifically 77%, do watch video game streams. On average, they watch streams three days a week; the median value is two. For exact distribution, see graph 3.3. Almost 40% of respondents watch specific people and do not care which game they play; 30% then watch only a specific part of a game they are interested in, either as a guide or to make a better judgment about the title. More than a half (63%) of respondents then believe a streamer's opinion about a specific game; however, fewer people (58%) would buy a game based on their recommendation. Details can be found in table 3.3.

Graph 3.3: Histogram of number of days watching

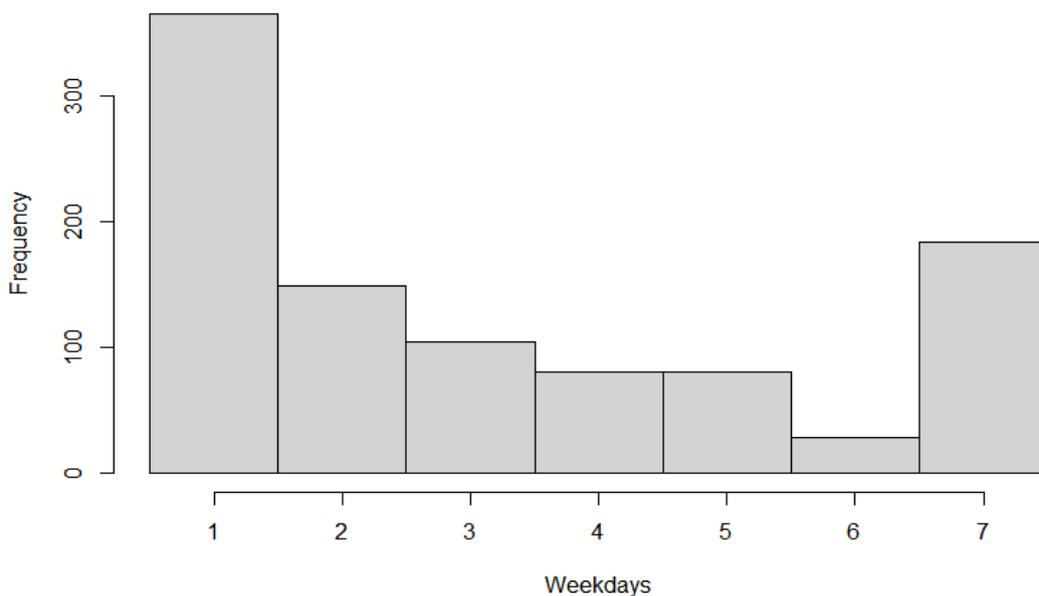


Table 3.3: Stream audience

Variable	Frequency	Percentage
<b>Does watch streams or videos</b>		
Yes	762	76,97%
No	228	23,03%
<b>Type of content</b>		
Full playthrough	128	12,93%
Specific person	371	37,47%
Only part of a game	305	30,81%
<b>Trust in streamer or influencer</b>		
Yes	624	63,03%
No	366	36,97%
<b>Would buy based on their recommendation</b>		
Yes	577	58,28%
No	413	41,72%

Another section focused on players' purchase decisions; similar questions were asked concerning AAA titles and indie production. On average, respondents buy 10 games a year. However median value for this variable is 5. This is likely because some people, game collectors, for instance, tend to buy close to a hundred games per year while some players pay subscription fees in order to receive games for free and therefore buy almost none. The distribution of yearly game purchases can be seen in graph 3.4. Furthermore, 51% of respondents stated that they buy games mainly when they are on sale, 19% buy them when released, 13% in a year since release, and 17% use mainly subscription services. Concerning purchase decisions based on watching streams, 64% of respondents said that they do not care about the number of ways a game can be played; 33% would buy a game they watched only if there was another way to play through it. And 3% would only buy a game that offers the same playthrough they already watched. Apart from streams, other factors play a role in decisions to buy a game, 78% of respondents choose based on their preferred genre, 60% based on user reviews, 55% professional reviews, 54% on trailers or ads, 45% believe in a specific studio, and almost 9% admitted to first download an illegal copy of a game, two respondents actually said that they play only pirated copies. Most commonly, players use three other sources when deciding about game purchases.

When asked about purchase intention of AAA title, 32% stated that they always buy it, 46% would buy based on watching a stream, 11% if they have not watched, and 12% not at all. Concerning indie titles, the purchase intentions were overall lower, with 18% always buying, 52% buying after watching, 11% if they have not watched, and 19% would not buy. On average, gamers would pay 1513 CZK for AAA title and 538 CZK for indie one. Details on purchase decisions are in table 3.4. Furthermore, table 3.5 captures average WTP and yearly game purchases based on when and how players tend to buy games. Distributions of stated prices are in graphs 3.5 and 3.6.

Table 3.4: Purchase decisions

Variable	Frequency	Percentage
<b>Buy AAA title</b>		
Always	313	32%
After watching	454	46%
Not watching	105	11%
Never	118	12%
<b>Buy indie title</b>		
Always	182	18%
After watching	517	52%
Not watching	106	11%
Never	185	19%
<b>Games bought</b>		
On release day	192	19%
In a year since release	126	13%
On sale	506	51%
Subscriptions	166	17%
<b>Kind of game bought after watching</b>		
Several possible playthroughs	331	33%
Indifferent	634	64%
One possible playthrough	25	3%
<b>Other sources</b>		
Trailer and ads	530	53,54%
Professional reviews	550	55,56%
User reviews	592	59,80%
Genre	775	78,28%
Studio	446	45,05%
Pirate	85	8,59%
<b>Number of other used resources</b>		
1	123	12%
2	194	20%
3	339	34%
4	213	22%
5	109	11%
6	12	1%

Graph 3.4: Histogram of yearly purchases

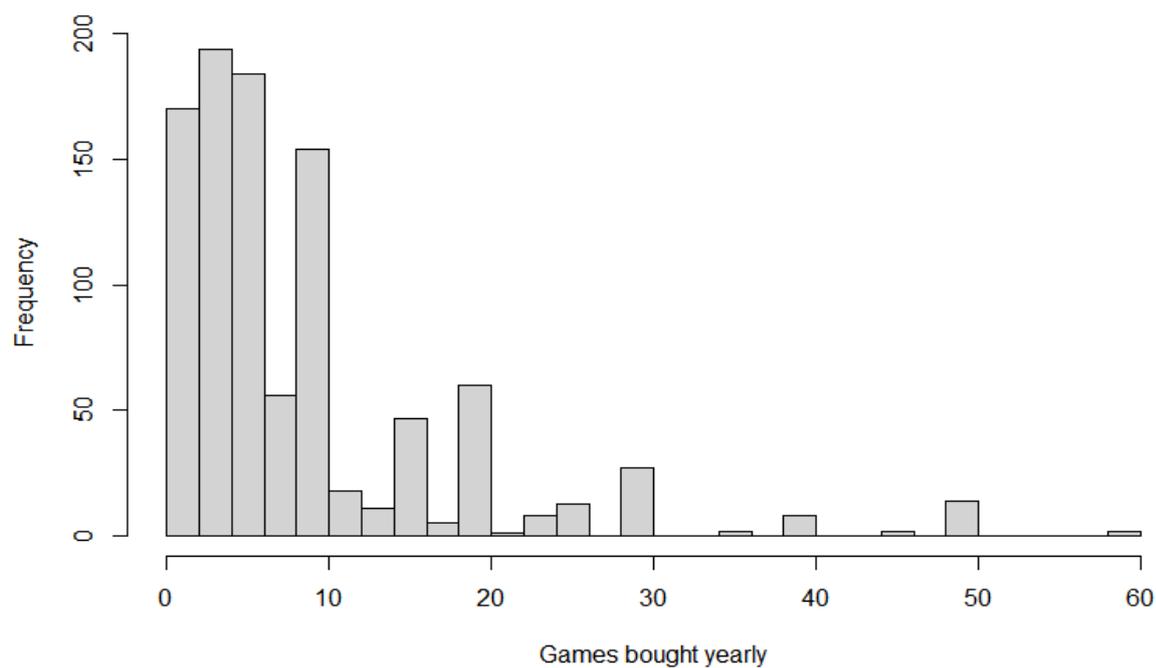
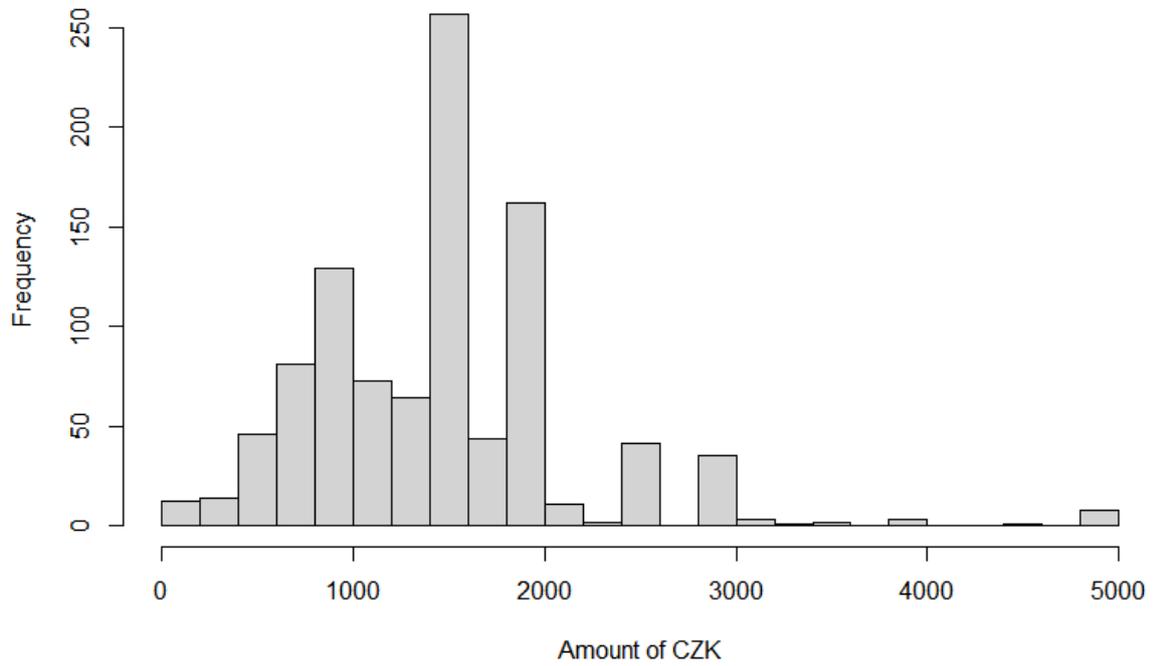


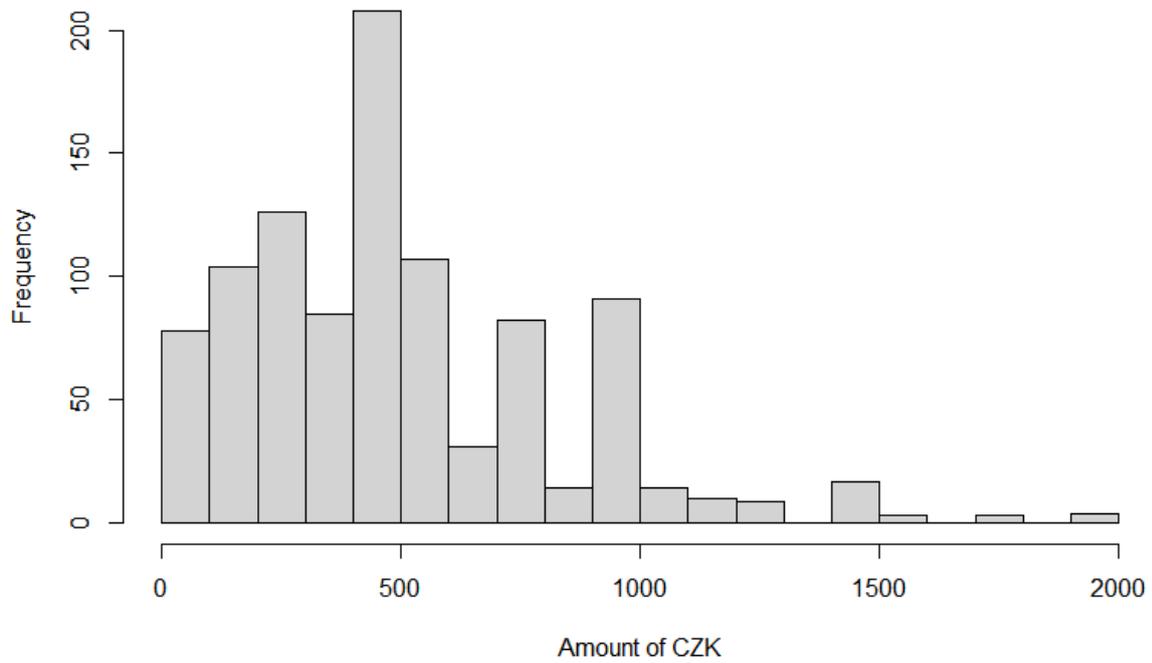
Table 3.5: Average price and number of games based on purchase type

<b>Game bought</b>	<b>Avg. price for AAA game</b>	<b>Avg. price for indie game</b>	<b>Avg. games bought yearly</b>
In a year	1 660 CZK	553 CZK	11
Release	2 042 CZK	782 CZK	14
Sale	1 284 CZK	462 CZK	10
Subscriptions	1 490 CZK	479 CZK	7

Graph 3.6: Histogram of stated prices for AAA



Graph 3.5: Histogram of stated prices for indie



### 3.3 Variables and hypotheses

In this section, relevant variables that will later be used in the analysis will be mentioned, along with hypotheses about their effects.

#### 3.3.1 Dependent variables

During the survey, respondents were asked about their purchase intentions and the price they would pay for AAA and indie titles. The questions "You would buy AAA/indie title:" had four possible answers; "Always," "Based on a stream or gameplay video," "Only if I haven't watched a stream," and "Never." The first two answers were then assigned a value of 1 and the last two a value of 0, indicating the purchase intention based on watching streams. The variables *binWTPAAA* and *binWTPindie* will be used in a logit model. Furthermore, participants were asked which price would they be willing to pay for AAA and indie titles; the answers form variables *priceAAA* and *priceindie* measured in CZK. They will be further analysed using ordinary least squares.

#### 3.3.2 Explanatory variables

##### 3.3.2.1 Demographic variables

*Age* is a continuous variable measured in years; *Male* is a categorical variable with a value of 1 if the participant is a man and 0 if a woman. *Education* is an ordered variable that takes the form of 1 for primary education, 2 for high school, 3 for undergraduate, and 4 for a university degree. *Occupation* is a categorical variable representing the working status of an individual. *Income* is an ordered variable with a value of 1 for people earning less than 20 thousand CZK, then increased by 1 for each additional 5 thousand they earn, ending with a value of 6 for people earning more than 40 thousand CZK.

*Note: Hypotheses are denoted "a" for AAA and "i" for indie games.*

**Hypotheses 1a, 1i:** *Age has a significant negative effect on the price a customer is willing to pay for AAA/indie titles.*

**Hypotheses 2a, 2i:** *Male has a significant negative effect on purchase intention.*

**Hypotheses 3a, 3i:** *Male has a significant negative effect on the price a customer is willing to pay for AAA/indie titles.*

**Hypotheses 4a, 4i:** *Education has a significant negative effect on purchase intention.*

**Hypotheses 5a, 5i:** *Being a student has a significant positive effect on purchase intention.*

**Hypotheses 6a, 6i:** *Being a student has a significant negative effect on the price a customer is willing to pay for AAA/indie titles.*

**Hypotheses 7a, 7i:** *Income has a significant positive effect on the price a customer is willing to pay for AAA/indie titles.*

##### 3.3.2.2 Gamer preference variables

*Nplatforms* is an ordered variable with values from 1 to 5 representing the number of gaming platforms actively used by respondents. *Ngenres* is a similar ordered variable; values range from 1 to 6 and represent the number of preferred genres. *Type* is a categorical variable representing whether players identify as "Hardcore," "In between," or "Casual." *Hours* is a continuous variable that represents how many hours a day a respondent spends gaming.

**Hypotheses 8a, 8i:** *Nplatforms* has a significant positive effect on the price a customer is willing to pay for AAA/indie titles.

**Hypotheses 9a, 9i:** *Ngenres* has a significant positive effect on purchase intention.

**Hypotheses 10a, 10i:** *Ngenres* has a significant positive effect on the price a customer is willing to pay for AAA/indie titles.

**Hypotheses 11a, 11i:** Being a hardcore player significantly increases the chance of purchasing.

**Hypotheses 12a, 12i:** Being a hardcore player significantly increases the price a customer is willing to pay for AAA/indie titles.

**Hypothesis 13a, 13i:** *Hours* has a significant positive effect on the price a customer is willing to pay for AAA/indie titles.

### 3.3.2.3 Stream audience variables

*Watch* is a binary variable with a value of 1 if a respondent watches streams and 0 if they do not. *DaysWatching* is a variable with values from 1 to 7 representing the number of days a respondent watches a stream or a video in a week. Another binary variable, *Trust*, represents whether a respondent believes a streamer's opinion; its value is 1 if they do and 0 if not. *BuyOnRec* represents the willingness to buy a game based on a streamer's recommendation; it takes a value of 1 if a respondent is willing and 0 if not.

**Hypotheses 14a, 14i:** *Watch* has a significant positive effect on purchase intention

**Hypotheses 15a, 15i:** *DaysWatching* has a significant positive effect on purchase intention.

**Hypotheses 16a, 16i:** *Trust* has a significant positive effect on purchase intention.

**Hypotheses 17a, 17i:** *BuyOnRec* has a significant positive effect on purchase intention.

### 3.3.2.4 Purchase decision variables

*Bought* is a continuous variable representing the number of games bought yearly. *When* is a categorical variable explaining the way a respondent tends to buy games, its values are "In a year" meaning within a year since release date, "Release" for purchases close to release date, "Sale" for games bought mainly in sales, and "Subscription" for respondents using services that provide free games for a periodical fee. *Nother* is a variable with values from 1 to 6 representing the number of other sources a respondent uses when deciding about a purchase. *Way* is a categorical variable representing what type of game respondents are willing to buy after first seeing it in a stream or a video. It takes values of "One" meaning games that offer only one possible way to beat them, "Several" meaning games that offer several different playthroughs, and "Indifferent" for respondents to whom it does not matter.

**Hypotheses 18a, 18i:** *Bought* has a significant positive effect on purchase intention.

**Hypotheses 19a, 19i:** *Bought* has a significant positive effect on the price a customer is willing to pay for AAA/indie titles.

**Hypotheses 20a, 20i:** Buying on sale has a significant negative effect on purchase intention.

**Hypotheses 21a, 21i:** Buying on sale has a significant negative effect on the price a customer is willing to pay for AAA/indie titles.

**Hypotheses 22a, 22i:** *Buying on release has a significant positive effect on purchase intention.*

**Hypotheses 23a, 23i:** *Buying on release has a significant positive effect on the price a customer is willing to pay for AAA/indie titles.*

**Hypotheses 24a, 24i:** *Being a subscriber has a significant negative effect on purchase intention.*

**Hypotheses 25a, 25i:** *Neither has a significant positive effect on purchase intention.*

## 4 Methodology

In this work, two types of dependent variables mentioned in the previous section will be analysed. This section will focus on the theory behind the analysis. The theory is based on Woolridge (2020). Any bold variables represent vectors. For example  $\boldsymbol{\beta} = (\beta_1, \beta_2, \dots, \beta_n)$ .

### 4.1 Concepts

The variable depicting purchase intention can only take a value of 1 or 0 if it falls into the limited dependent variable (LDV) category, meaning it has a limited range of possible values. Because of that, there are several problems in estimating it using ordinary least squares. Firstly, fitted probabilities could be either less than zero or higher than one, leading to unrealistic predictions. Secondly, the partial effect of explanatory variables would be constant. Therefore, a better approach can be adopted.

When using a binary response model, we focus mainly on response probability,  $P(y = 1|\mathbf{x})$ , where  $\mathbf{x}$  denotes the full set of explanatory variables. In order to ensure fitted values can range only from 0 to 1, we can use a nonlinear function  $G$ , for which  $0 < G(z) < 1$ , for all real numbers  $z$ .

$$P(y = 1|\mathbf{x}) = G(\beta_0 + \boldsymbol{\beta}_x)$$

*Equation 4.1*

From the functions that are being used as  $G$ , two are used in a vast majority of cases. These two are the logistic function, used in logit models, and standard normal cumulative distribution function (cdf) for probit models.

Logistic function:

$$G(z) = \exp(z) / (1 + \exp(z))$$

*Equation 4.2*

Cumulative distribution function:

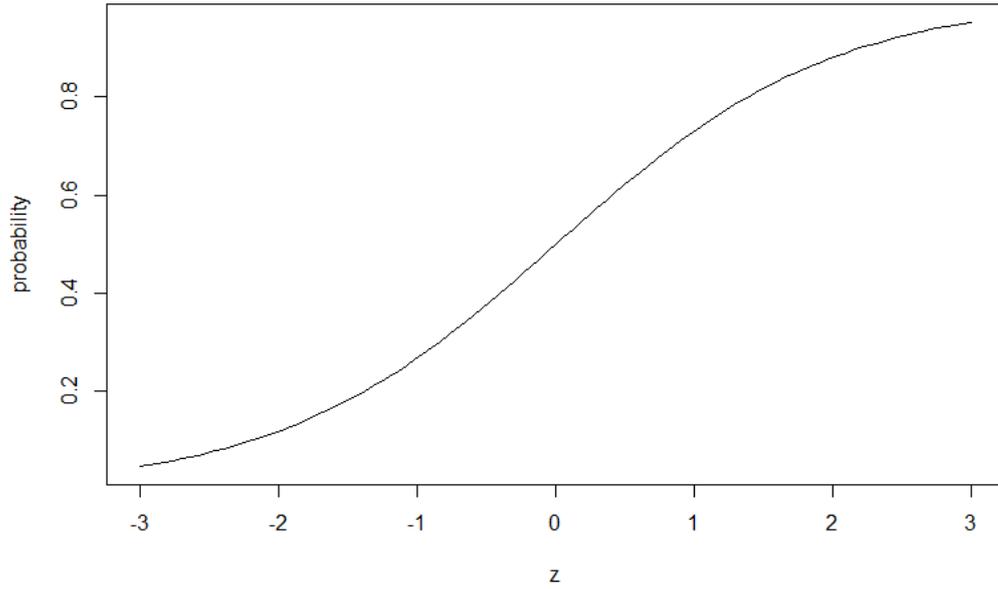
$$G(z) = \int_{-\infty}^z (2\pi)^{-1/2} * \exp\left(\frac{-z^2}{2}\right)$$

*Equation 4.3*

Both logistic and cdf functions are increasing; each increases most quickly around zero. For both  $G(z) \rightarrow 0$  as  $z \rightarrow -\infty$  and  $G(z) \rightarrow 1$  as  $z \rightarrow \infty$ .

The shape of the logistic function can be seen in graph 4.1.

Graph 4.1: Logistic function



Both logit and probit can be derived using the latent variable

$$y^* = \beta_0 + \mathbf{x}\boldsymbol{\beta} + e, \quad y = 1 \text{ for } y^* > 0, y = 0 \text{ otherwise}$$

Equation 4.4

Due to the nonlinear nature of these models, estimation has to be done using maximum likelihood estimation (MLE) method. With a sample size of  $n$ , to obtain MLE, we need the density of  $y_i$  given  $\mathbf{x}_i$ . It can be written like this:

$$f(y|\mathbf{x}_i; \boldsymbol{\beta}) = [G(\mathbf{x}_i\boldsymbol{\beta})]^y * [1 - G(\mathbf{x}_i\boldsymbol{\beta})]^{1-y}, y = 0,1$$

Equation 4.5

Taking the log of Equation 4.5 and summing it across all observations, we get:

$$L(\boldsymbol{\beta}) = \sum_{i=1}^n y_i \log[G(\mathbf{x}_i\boldsymbol{\beta})] + (1 - y_i) \log[1 - G(\mathbf{x}_i\boldsymbol{\beta})]$$

Equation 4.6

For the sample size of  $n$ ,  $\hat{\boldsymbol{\beta}}$  is the MLE of  $\boldsymbol{\beta}$ , and maximizes the log-likelihood. If  $G(\cdot)$  is the standard normal cdf, then  $\hat{\boldsymbol{\beta}}$  is the probit estimator, if  $G(\cdot)$  is standard logit cdf, then  $\hat{\boldsymbol{\beta}}$  is the logit estimator. However, as they are nonlinear, it is too complicated to write formulas for logit and probit maximum likelihood estimates.

## 4.2 Used models

As both logit and probit tend to produce very similar results (Woolridge, 2020), the logit model will be used in this study for the purposes of analysing purchase intentions. Standard OLS will then be used for analysing price as the dependent variable. The models represented by Equation 4.7 and Equation 4.8 will be used for both the AAA and indie titles in the same form.

Note:  $G(\cdot)$  represents logistic function mentioned in 4.1, bold coefficients represent a set of dummy variables

$$\begin{aligned}
 P(\text{binWTP} = 1|\mathbf{x}) &= G(\beta_0 + \beta_1\text{Age} + \beta_2\text{Male} + \beta_3\text{Education} + \mathbf{\beta}_4\text{Occupation} \\
 &+ \beta_5\text{Income} + \beta_6\text{Nplatforms} + \beta_7\text{Ngenres} + \mathbf{\beta}_8\text{Type} + \beta_9\text{Hours} \\
 &+ \beta_{10}\text{Watch} + \beta_{11}\text{DaysWatching} + \beta_{12}\text{Trust} + \beta_{13}\text{BuyOnRec} \\
 &+ \beta_{14}\text{Bought} + \mathbf{\beta}_{15}\text{When} + \beta_{16}\text{Nother} + \mathbf{\beta}_{17}\text{Way})
 \end{aligned}$$

Equation 4.7

$$\begin{aligned}
 \text{price} &= \beta_0 + \beta_1\text{Age} + \beta_2\text{Male} + \beta_3\text{Education} + \mathbf{\beta}_4\text{Occupation} + \beta_5\text{Income} \\
 &+ \beta_6\text{Nplatforms} + \beta_7\text{Ngenres} + \mathbf{\beta}_8\text{Type} + \beta_9\text{Hours} + \beta_{10}\text{Watch} \\
 &+ \beta_{11}\text{DaysWatching} + \beta_{12}\text{Trust} + \beta_{13}\text{BuyOnRec} + \beta_{14}\text{Bought} \\
 &+ \mathbf{\beta}_{15}\text{When} + \beta_{16}\text{Nother} + \mathbf{\beta}_{17}\text{Way}
 \end{aligned}$$

Equation 4.8

The data analysis will be performed in R using RStudio.

## 5 Results

In this chapter, the results based on models mentioned in section 4.2 will be interpreted. Firstly, the effects of explanatory variables on binary WTP for both AAA and indie titles will be interpreted. Secondly, the interpretation of the effects on price the respondents stated to be willing to pay for AAA or indie games will be introduced. Moreover, the profit maximization based on collected data will be explored.

### 5.1 Logit model

The initial model represented by *Equation 4.7* includes a high number of explanatory variables, not all of them significant in the model. Therefore, several different models were created using the training set and tested against the test set. The best-fitted models based on the likelihood ratio and accuracy on the test set were then chosen for both AAA and indie titles. For AAA titles, a model represented by *Equation 5.1*, and for indie, a model in *Equation 5.2* were chosen. The full lists of tested models can be found in *Table 5.1* for AAA and *Table 5.4* for indie.

The final model (2) chosen for AAA titles:

$$\begin{aligned} P(\text{binWTPAAA} = 1 | \mathbf{x}) \\ = G(\beta_0 + \beta_1 \text{Age} + \beta_2 \text{Education} + \beta_3 \text{Occupation} + \beta_4 \text{Income} \\ + \beta_5 \text{Watch} + \beta_6 \text{BuyOnRec} + \beta_7 \text{When}) \end{aligned}$$

*Equation 5.1*

Table 5.1: Tested logit models for purchase intention of AAA titles

Variable (base in brackets)	Dependent variable:			
	Purchase intention of AAA			
	(1)	(2)	(3)	(4)
Age	0.028	0.021		
Male	-0.282			
Education	-0.210	-0.192	-0.126	
Occupation (Employed)				
Retired	0.801	0.977		
Student	0.565*	0.521*		
Unemployed	0.655	0.668		
Income	0.125	0.117		
Number of platforms	-0.108			
Number of genres	0.114			0.121
Type (Between)				
Casual	-0.013			
Hardcore	0.394			
Watch	0.763***	0.790***	0.789***	0.735***
Days of week watching	-0.006			
Trust in streamer	0.298			0.296
Buy on recommendation	0.767***	0.850***	0.845***	0.731***
Hours of play daily	0.013			
Games bought yearly	0.009		0.012*	0.011
When bought (In a year)				
Release	0.735*	0.693*	0.724*	0.735*
Sale	-0.628**	-0.728**	-0.713**	-0.698**
Subscription	-0.471	-0.571	-0.469	-0.514
Number of other sources	0.119			
Ways of play (Indifferent)				
One	-0.318			
Several	-0.223			
Constant	-0.660	-0.029	0.761*	0.085
Observations	796	796	796	796
Log Likelihood	-372.101	-379.607	-380.410	-378.958
Test set accuracy	0.753	0.778	0.758	0.758

Significance levels:

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

The selected model consists of 796 observations; the McFadden pseudo R<sup>2</sup> is equal to 0.1, meaning that the explanatory variables can explain 10% of the variance in purchase intention for AAA. The model's accuracy on the test set equals 0.778; the confusion matrix can be seen in Table 5.2.

Table 5.2: Confusion matrix for model (2) for AAA titles

		Predicted	
		0	1
Actual	0	7	39
	1	4	144

The final model chosen for indie titles:

$$\begin{aligned}
 P(\text{binWTP} = 1|\mathbf{x}) &= G(\beta_0 + \beta_1\text{Education} + \beta_2\text{Income} + \beta_3\text{Ngenres} + \beta_4\text{Watch} \\
 &+ \beta_5\text{Trust} + \beta_6\text{BuyOnRec} + \beta_7\text{Bought} + \beta_8\text{When})
 \end{aligned}$$

Equation 5.2

The selected model consists of 796 observations; the McFadden pseudo  $R^2$  is equal to 0.106, meaning that 10,6% of the variance in purchase intention for AAA can be explained by the explanatory variables. The model's accuracy on the test set is equal to 0.747; the confusion matrix can be seen in Table 5.3.

Table 5.3: Confusion matrix for model (3) for indie titles

		Predicted	
		0	1
Actual	0	18	32
	1	17	127

Table 5.4: Tested logit models for purchase intention of indie titles

Variable (base in brackets)	Dependent variable:			
	Purchase intention of indie			
	(1)	(2)	(3)	(4)
Age	-0.004	-0.005		
Male	-0.004			
Education	-0.163	-0.132	-0.175*	
Occupation (Employed)				
Retired	0.104	-0.178		
Student	-0.005	-0.117		
Unemployed	0.248	-0.039		
Income	0.079		0.073	
Number of platforms	0.011			
Number of genres	0.143*	0.171**	0.169**	0.171**
Type (Between)				
Casual	-0.017			
Hardcore	0.017			
Watch	0.755***	0.625***	0.654***	0.652***
Days of week watching	-0.030			
Trust in streamer	0.516**	0.836***	0.501**	0.511**
Buy on recommendation	0.645***		0.670***	0.658***
Hours of play daily		-0.021		
Games bought yearly	0.016**	0.014**	0.014**	0.016**
When bought (In a year)				
Release	0.483	0.433	0.397	0.454
Sale	-0.270	-0.331	-0.301	-0.320
Subscription	-0.752**	-0.758**	-0.798***	-0.782**
Number of other sources	0.092			
Ways of play (Indifferent)				
One	-0.769			-0.820
Several	0.265			0.296
Constant	-0.708	-0.073	-0.538	-0.805**
Observations	796	796	796	796
Log Likelihood	-432.218	-443.162	-436.397	-434.982
Test set accuracy	0.748	0.758	0.748	0.727

Significance levels:

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

### 5.1.1 Results of logit

According to Woolridge (2020), the logit regression coefficients can be difficult to interpret as their magnitudes do not represent the actual effect, even though the effects depend on the sign of the coefficients. Therefore, a table of marginal effects for both models was computed and is available in *Table 5.5*.

*Table 5.5: Marginal effects of explanatory variables*

Variable (base in brackets)	Marginal effects	
	AAA	indie
Age	0.003	
Education	-0.030	-0.035 ·
Occupation (Employed)		
Retired	0.110	
Student	0.078 ·	
Unemployed	0.084	
Income	0.018	0.015
Number of genres		0.034 *
Watch	0.139 ***	0.140 **
Trust in streamer		0.103 *
Buy on recommendation	0.138 ***	0.137 ***
Games bought yearly		0.003 *
When bought (In a year)		
Release	0.094 *	0.075
Sale	-0.112 *	-0.060
Subscription	-0.099	-0.176 *

*Significance levels: · p<0.1; \*p<0.05; \*\*p<0.01; \*\*\*p<0.0001*

Based on the models, from the demographic variables, only *Education* is significant at 10% level for indie titles, and *Student* is significant at 10% for AAA titles. Furthermore, *Ngenres*, *Trust*, *Bought*, and *Subscription* compared to buying in a year are significant at 5% for the indie model. *Watch* and *BuyOnRec* are significant at 0,01% for both models, and buying on *Release* or in *Sale* is significant at 5% level for the AAA model. For other variables, *Age*, *Male*, *Income*, *Nplatforms*, *Type*, *DaysWatching*, *Hours*, *Nother*, and *Ways*, there is not enough evidence to reject the null hypothesis that they are equal to 0.

**Hypotheses 2a, 2i:** *Male has a significant negative effect on purchase intention.*

There is not enough evidence to support these hypotheses even at 10% significance level. Therefore, there is nothing that can be said about the effect of gender on purchase decisions.

**Hypotheses 4a, 4i:** *Education has a significant negative effect on purchase intention.*

At 10% significance level, hypothesis 4i is supported; however, there is not enough evidence to support hypothesis 4a. The marginal effect of level of education is -0,035, meaning that each higher level of education decreases the chance of purchasing an indie game after watching it by 3,5%. On the other hand, there is no reliable information about the effect on purchasing AAA games.

**Hypotheses 5a, 5i:** *Being a student has a significant positive effect on purchase intention.*

There is not enough evidence to support hypothesis 5i at 10% significance level. On the other hand, at 10%, the effect of being a student compared to being employed is significant, and hypothesis 5a is supported. The marginal effect is 0,078, which means that students are 7,8% more likely to purchase AAA titles after watching a stream than employed people.

**Hypotheses 9a, 9i:** *Ngenres has a significant positive effect on purchase intention.*

Hypothesis 9a can not be supported even at 10% significance level. Hypothesis 9i is supported at 5% level with a marginal effect of 0.034, meaning that each additional genre a gamer is interested in, increases the after-watching purchase probability of indie titles by 3,4%.

**Hypotheses 11a, 11i:** *Being a hardcore player significantly increases the chance of purchasing.*

There is not enough evidence to support these hypotheses at 10% significance levels.

**Hypotheses 14a, 14i:** *Watch has a significant positive effect on purchase intention.*

The effect of *Watch* is significant at 0,01% level; therefore, both hypotheses are supported. The marginal effect of *Watch* on purchasing based on watching for AAA is 0,139, and for indie, it is 0,14. This means that watching streams regularly increases the chance of purchase after watching by 13,9% and 14% for AAA and indie games, respectively.

**Hypotheses 15a, 15i:** *DaysWatching has a significant positive effect on purchase intention.*

There is nothing that can be said about the effect of *DaysWatching* since these hypotheses can not be supported at 10% significance levels.

**Hypotheses 16a, 16i:** *Trust has a significant positive effect on purchase intention.*

There is not enough evidence to support hypothesis 16a. However, hypothesis 16i is supported at 5% significance level. The marginal effect of *Trust* is 0,103; believing in a streamer's opinion increases the chance of purchasing an indie title after watching it by 10,3%. Furthermore, the

variables *Trust*, *DaysWatching*, and *Watch* are likely to be correlated, which might mean that the actual effects of these variables are lower.

**Hypotheses 17a, 17i:** *BuyOnRec has a significant positive effect on purchase intention.*

Both are supported at 0,01% significance level, with marginal effects of 0,138 and 0,137 for AAA and indie, respectively. Intuitively, gamers who state they would buy a game based on the streamer's recommendation are more likely to purchase it after watching a stream. Specifically, 13,8% for AAA and 13,7% for indie, more likely.

**Hypotheses 18a, 18i:** *Bought has a significant positive effect on purchase intention.*

Hypothesis 18a was not supported at 10% significance level. Hypothesis 18i was supported at 5% significance level with a marginal effect value of 0,003. Therefore, each additional game purchased in a year increases the chance of buying an indie title after watching by 0,3%.

**Hypotheses 20a, 20i:** *Buying on sale has a significant negative effect on purchase intention.*

Of these, only hypothesis 20a is supported. At 5% significance level, the marginal effect of buying on sale compared to those who buy in a year since release is -0,112, which means that the chance of purchasing AAA after watching decreases by 11,2% if the dominant form of purchase is a sale.

**Hypotheses 22a, 22i:** *Buying on release has a significant positive effect on purchase intention.*

Again, only hypothesis 22a is supported at 5% significance level. The marginal effect is 0.094. Therefore, buying on release day increases the chance of buying after watching a stream by 9,4% for AAA titles compared to buying in a year since release. However, nothing can be said about the effect for indie games.

**Hypotheses 24a, 24i:** *Being a subscriber has a significant negative effect on purchase intention.*

In this case, hypothesis 24a can not be supported at 10% significance level. On the other hand, hypothesis 24i is supported at 5% level. As the marginal effect is -0,176, it means that for an indie title, using subscription services decreases the chance of purchase after buying by 17,6% compared to buying in a year since release.

**Hypotheses 25a, 25i:** *Nother has a significant positive effect on purchase intention.*

There is not enough evidence to support either of these hypotheses at 10% significance.

## 5.2 OLS model

Similar to logit, the initial model for OLS included too many explanatory variables and variables without any significance. Therefore, a similar procedure to choose the best-fitted model followed. The models were built using the training set and verified using the test set. The chosen best models for AAA and indie are represented by *Equation 5.3* and *Equation 5.4*. All tested models can be seen in *Table 5.5* and *Table 5.6*.

The final model (4) chosen for AAA titles:

$$\begin{aligned} price = & \beta_0 + \beta_1 Age + \beta_2 Male + \beta_3 Occupation + \beta_4 Nplatforms + \beta_5 Type \\ & + \beta_6 Hours + \beta_7 When \end{aligned}$$

*Equation 5.3*

The final selected model for AAA titles consists of 796 observations; the  $R^2$  value is equal to 0,186, meaning that 18,6% of the variance in price is explained in the training set. The test set value of  $R^2$  is 0,161; thus, the model explains 16,1% variance in the separated test set. The test set RMSE is then 640,387, which is the lowest of all tested models.

The final model (3) chosen for indie titles:

$$price = \beta_0 + \beta_1 Age + \beta_2 Occupation + \beta_3 Ngenres + \beta_4 When$$

*Equation 5.4*

The final OLS model for the price of indie titles also includes 796 observations. The training set  $R^2$  is equal to 0,118, and test set  $R^2$  is 0,12, explaining 11,8% and 12% for the train and test set, respectively. The test set RMSE is 337,571, which is the second-lowest value of the tested models. However, the model with the lowest value was similar to the selected one, with just an addition of a variable that was not significant.

Table 5.6: Tested OLS models for the price of AAA titles

Variable (base in brackets)	Dependent variable:			
	price AAA			
	(1)	(2)	(3)	(4)
Age	-3.651	-6.356	-5.368	-6.038
Male	-184.672**	-144.341*	-142.126*	-136.554*
Education	-53.410			
Occupation (Employed)				
Retired	-73.131	-101.051	-115.714	-146.963
Student	-290.691***	-272.992***	-294.597***	-295.528***
Unemployed	-245.472	-215.620	-279.207	-256.930
Income	14.440			
Number of platforms	42.301			53.777**
Number of genres	0.377	15.045		
Type (Between)				
Casual	-19.236	-41.540	-34.160	-34.961
Hardcore	155.731**	170.332**	160.036**	165.506**
Watch	23.131			
Days of week watching	14.426			
Trust in streamer	-20.477			
Buy on recommendation	-15.733			
Hours of play daily	11.578		17.258*	17.050*
Games bought yearly	2.036	2.811*		
When bought (In a year)				
Release	358.834***	349.991***	347.413***	353.407***
Sale	-297.067***	-308.960***	-308.090***	-305.984***
Subscription	-112.737	-123.105	-130.875	-126.354
Number of other sources	20.393			
Ways of play (Indifferent)				
One	-250.665			
Several	-34.458			
Constant	1,803.651***	1,938.434***	1,926.049***	1,822.960***
Observations	796	796	796	796
R <sup>2</sup>	0.196	0.183	0.182	0.186
F Statistic	8.196*** (df = 23; 772)	14.655*** (df = 12; 783)	15.848*** (df = 11; 784)	14.944*** (df = 12; 783)
Test set R <sup>2</sup>	0.153	0.147	0.154	0.161
Test set RMSE	644.394	645.692	642.391	640.387

Significance levels:

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

Table 5.7: Tested OLS models for the price of indie titles

Variable (base in brackets)	Dependent variable:			
	price indie			
	(1)	(2)	(3)	(4)
Age	-3.744	-4.962**	-4.904**	-4.600*
Male	-66.451	-48.754		
Education	-25.491			
Occupation (Employed)				
Retired	-12.730	-29.766	-26.075	-42.694
Student	-75.024	-88.782**	-85.970**	-86.242**
Unemployed	-65.232	-85.802	-73.407	-67.985
Income	11.660			
Number of platforms	15.076			
Number of genres	26.307**		34.990***	34.122***
Type (Between)				
Casual	-14.945	-23.654		-19.838
Hardcore	42.289	38.338		36.593
Watch	29.687			
Days of week watching	-5.192			
Trust in streamer	-23.591			
Buy on recommendation	43.955			
Hours of play daily	2.896			
Games bought yearly	0.329	0.715		
When bought (In a year)				
Release	238.661***	228.016***	234.317***	233.025***
Sale	-66.341	-79.718*	-89.717**	-81.871*
Subscription	-43.827	-42.382	-67.022	-59.652
Number of other sources	16.152			
Ways of play (Indifferent)				
One	-30.874			
Several	21.842			
Constant	539.522***	741.221***	605.847***	597.289***
Observations	796	796	796	796
R <sup>2</sup>	0.133	0.111	0.118	0.120
F Statistic	5.153*** (df = 23; 772)	8.894*** (df = 11; 784)	13.103*** (df = 8; 787)	10.683*** (df = 10; 785)
Test set R <sup>2</sup>	0.146	0.096	0.120	0.126
Test set RMSE	332.484	342.270	337.571	336.480

Significance levels:

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

### 5.2.1 Results of OLS

Concerning demographic variables, *Age* is significant at 5% level for indie titles, while *Gender* is significant at 10% for AAA titles. From *Occupation*, being a student is significant for both at least 5% level. Furthermore, *Nplatforms*, *Hardcore*, *Hours*, *Release*, and *Sale* are significant in the model of AAA prices at 10%. In the model of prices for indie, the variables *Ngenres*, *Release*, and *Sale* are significant at 5% level.

On the other hand, for the variables *Education*, *Income*, *Watch*, *DaysWatching*, *Trust*, *BuyOnRec*, *Bought*, *Nother*, and *Ways*, there is not enough evidence to reject the null hypothesis that they are equal to 0.

**Hypotheses 1a, 1i:** *Age has a significant negative effect on the price a customer is willing to pay for AAA/indie titles.*

There is not enough evidence to support hypothesis 1a at 10% significance. However, at 5%, *Age* is significant for the indie model with a coefficient value of -4,904, meaning that people are willing to pay approximately 5 CZK less for an indie title with each additional year of age.

**Hypotheses 3a, 3i:** *Male has a significant negative effect on the price a customer is willing to pay for AAA/indie titles.*

Hypothesis 3a is supported at 10% significance level; the coefficient for male is -136,554. Therefore, based on the model, men are willing to pay approximately 140 CZK less than women for AAA titles. However, hypothesis 3i could not be supported at 10% significance level.

**Hypotheses 6a, 6i:** *Being a student has a significant negative effect on the price a customer is willing to pay for AAA/indie titles.*

Both hypotheses are supported, 6a at 1%, 6i at 5% significance levels. The coefficient values are -295,528 and -85.970 for AAA and indie titles, respectively. Therefore, it can be stated that students are willing to pay 295 CZK for AAA and 85 CZK for indie less than an employed person.

**Hypotheses 7a, 7i:** *Income has a significant positive effect on the price a customer is willing to pay for AAA/indie titles.*

There is not enough evidence to support either of these hypotheses. We can not say anything about the effect of income on the price.

**Hypotheses 8a, 8i:** *Nplatforms has a significant positive effect on the price a customer is willing to pay for AAA/indie titles.*

From these two hypotheses, only hypothesis 8a is supported. The effect of the number of used platforms is significant at 5% level with a coefficient of 53,777. This means that each additional platform a customer uses increases their willingness to pay for AAA titles by 54 CZK.

**Hypotheses 10a, 10i:** *Ngenres has a significant positive effect on the price a customer is willing to pay for AAA/indie titles.*

On the other hand, between these hypotheses, there is sufficient evidence only to support hypothesis 10i. *Ngenres* is significant at 1% level, and the coefficient is 34,99 meaning each additional genre increases WTP for indie titles by 35 CZK.

**Hypotheses 12a, 12i:** *Being a hardcore player significantly increases the price a customer is willing to pay for AAA/indie titles.*

Only hypothesis 12a is supported in this case. *Hardcore* is significant at 5% level with a coefficient of 165,506. Compared to players who feel to be somewhere in between hardcore and casual, those who identify as hardcore are willing to pay 165 CZK more for AAA games.

**Hypothesis 13a, 13i:** *Hours has a significant positive effect on the price a customer is willing to pay for AAA/indie titles.*

Again, only the hypothesis for AAA titles 13a is supported at 10% significance level. With the coefficient of 17,050, we can say that each additional hour spent gaming in a day increases WTP for AAA games by 17 CZK.

**Hypotheses 19a, 19i:** *Bought has a significant positive effect on the price a customer is willing to pay for AAA/indie titles.*

We can not say anything about this effect, as at 10% significance level, there is not enough evidence to support either of hypotheses 19.

**Hypotheses 21a, 21i:** *Buying on sale has a significant negative effect on the price a customer is willing to pay for AAA/indie titles.*

Hypothesis 21a is supported at 1% significance level with a coefficient equal to -305,984. Hypothesis 21b is supported at 5% significance level with a coefficient equal to -89,717. Therefore, respondents who prefer sales are willing to pay 306 and 90 CZK less for AAA and indie titles, respectively, than those who buy within a year since release.

**Hypotheses 23a, 23i:** *Buying on release has a significant positive effect on the price a customer is willing to pay for AAA/indie titles.*

Both hypotheses are supported at 1% significance levels, with coefficients 353,407 and 234,317 for AAA and indie titles, respectively. People who buy on release are willing to pay 353 CZK more for AAA and 234 CZK more for indie than those who buy within a year since release.

### **5.3 Profit maximization and optimal price**

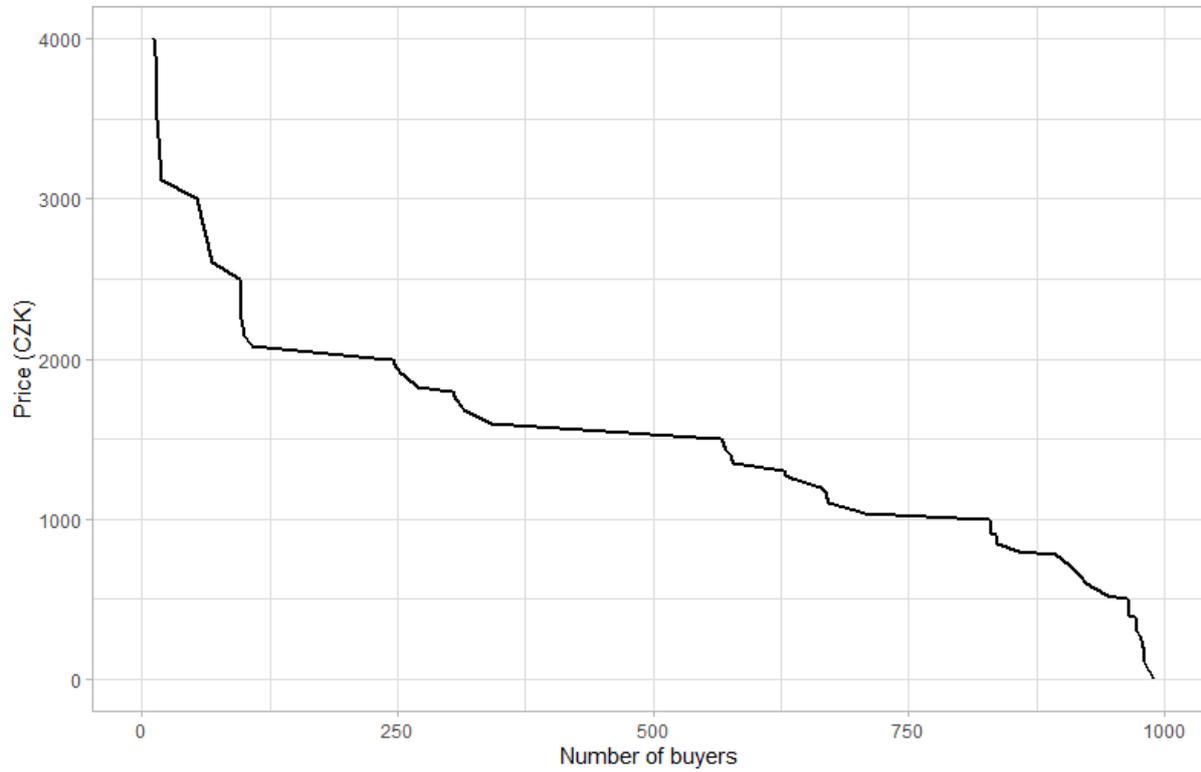
Generally, one of the most important questions for any profit maximizing company is setting the price correctly. In this section, demand and profit curves based on the questionnaire data will be derived.

For simplicity, let us assume a monopoly and zero production cost. Therefore, there is no competition in the markets, and the producer is a price maker. However, there are specific demands on the markets represented by *Graph 5.1* for the AAA market and *Graph 5.4* for the indie market. That is the only thing influencing the producer's decisions.

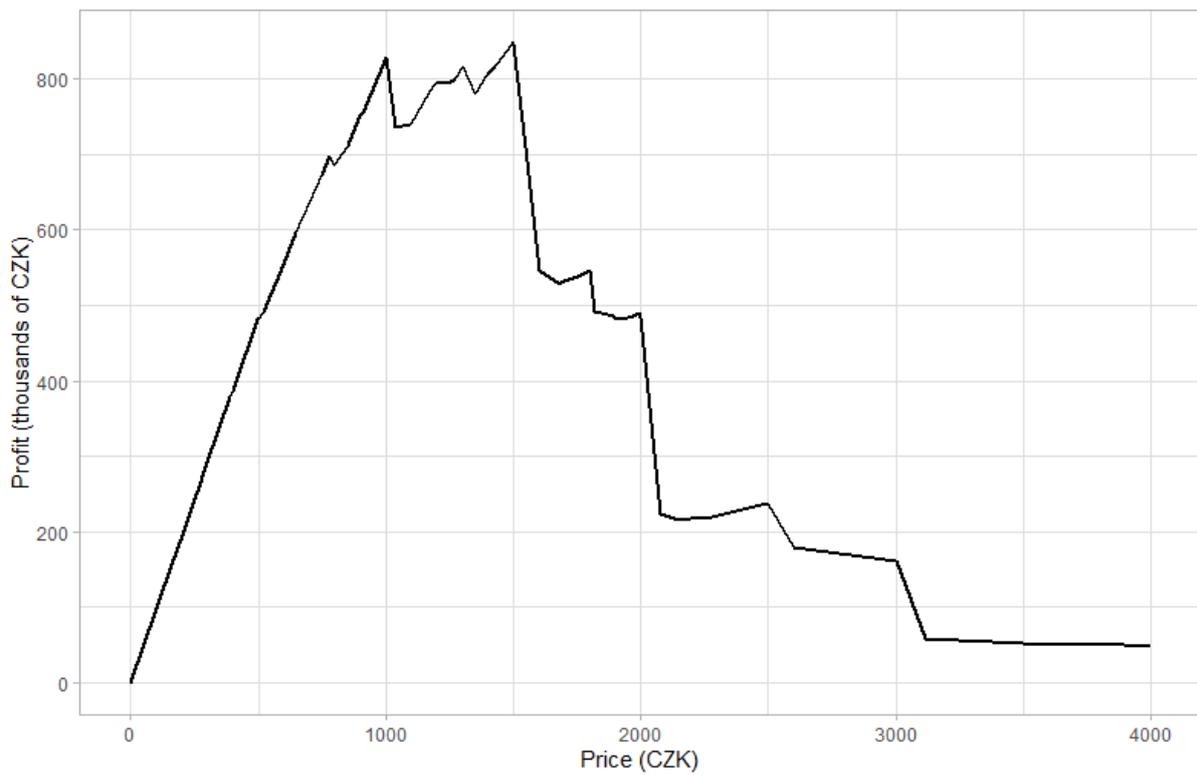
Based on these demand curves, profit curves can be derived. They are represented by *Graph 5.2* and *Graph 5.3* for AAA and indie markets, respectively. Based on the profit curves, the monopolist's profit-maximizing prices would be between 1000 and 1500 CZK for AAA games and 500 CZK for indie titles. There are several sharp points in the curves because when stating prices, people tend to round and state the actual prices of the goods.

However, this section is highly theoretical. Firstly, the game market is not a monopoly. Secondly, as an unlimited quantity of goods is available through digital distribution, classical models do not fully hold. And thirdly, since game companies can follow the pricing model that will be briefly introduced at the end of section 5.4.2, they can achieve much higher profits than if they just stick to one price.

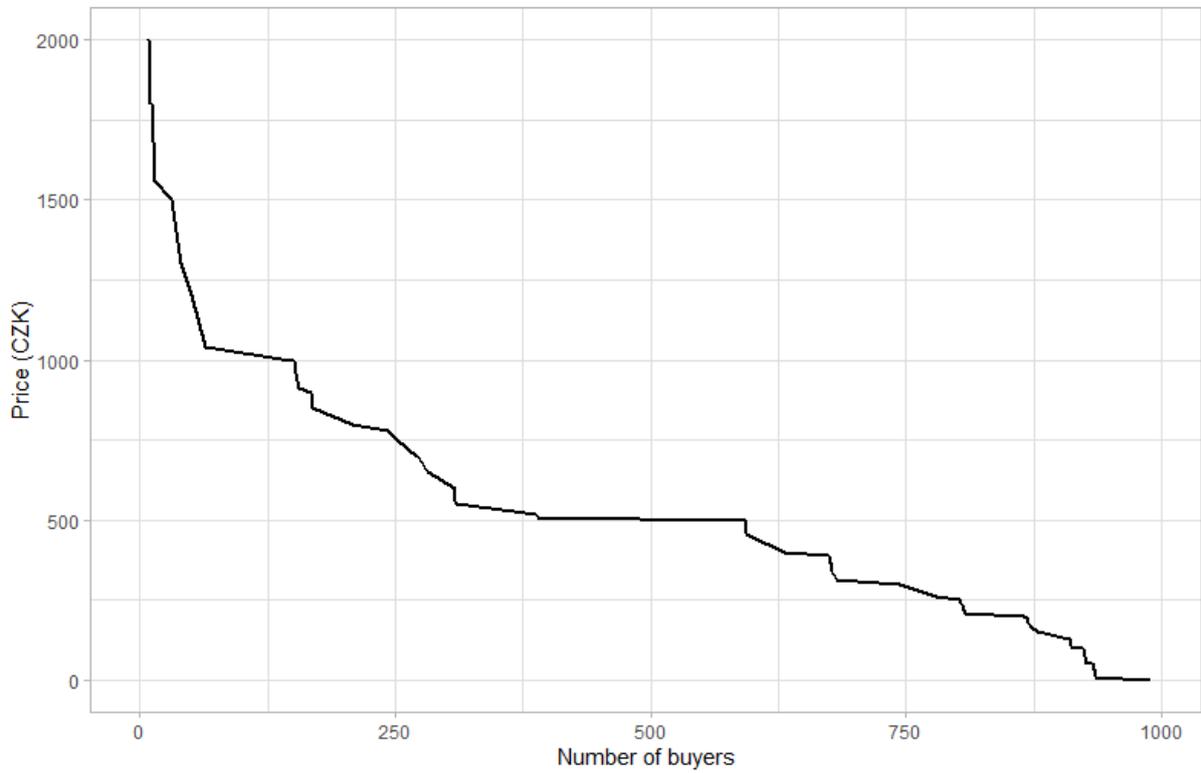
Graph 5.1: Demand for AAA games



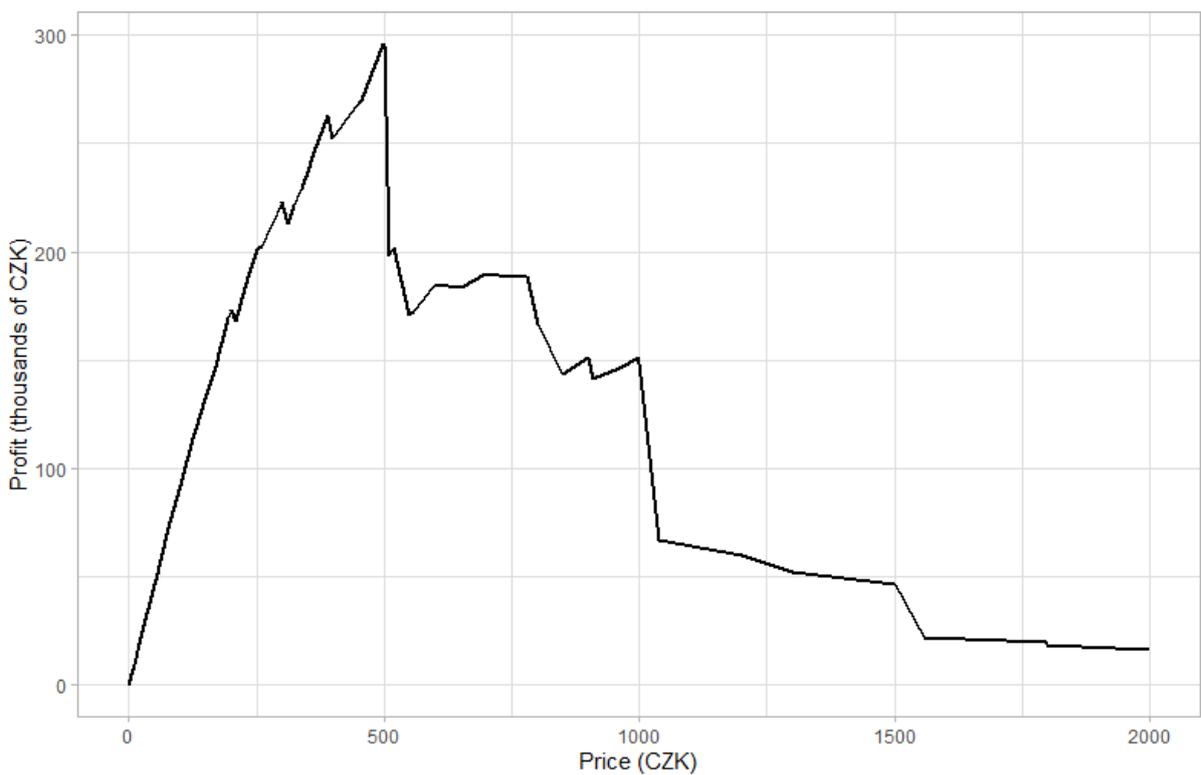
Graph 5.2: Profit curve for AAA



Graph 5.4: Demand for indie games



Graph 5.3: Profit curve for indie



## **5.4 Discussion**

### **5.4.1 Logit model**

According to the data and the regressions performed in the previous sections, less educated people are less willing to buy indie titles. The reason for this may be that people with higher education may have less free time (either because they continue studying on a higher level or work). Therefore, they decide to invest in "good quality" AAA games rather than experiment with smaller projects.

Being a student increases the probability of purchasing an AAA title based on watching a stream. Students generally have more free time to both play and watch streams. They may be more likely to be influenced by a streamer because they tend to choose games more carefully due to limited resources.

Furthermore, both people who watch streams and who trust a streamer's recommendation are more likely to buy either AAA or indie titles based on watching a stream. This is pretty self-explanatory, as people who regularly watch streams are more likely to be influenced by them. Moreover, a certain level of correlation between the people who watch and those who trust can be expected.

People who buy games on release day are more likely to buy them based on a stream than those who buy them in a year since release. The reasoning behind this effect comes from the marketing strategies of the developers. As mentioned in the literature review, some streamers receive the games a few days before the release; watching their stream is a good way to form an opinion about the product right before the purchase.

On the other hand, people who buy games on sale are less likely to buy an AAA title based on a stream. The explanation of the effect can be that the price is usually the main motivation for these gamers. Furthermore, being a subscriber decreases the chance of purchasing an indie game, probably because a large number of indie games are available for free from subscription services.

### **5.4.2 OLS model**

According to the models, the price people are willing to pay for indie games decreases with age. Again, the reason for this may be the fact that older people tend to have less free time and more other expenses than games.

Men are willing to pay approximately 140 CZK less for AAA title than women are. This may be caused by the women's natural affinity for shopping and buying new things. However, it might also be because women are rather under-represented in the sample. The women present can be considered more passionate gamers than average due to the way data were collected, as mentioned in section 3.2.

As students tend to have less disposable income, it seems reasonable that they are willing to pay less for both indie and AAA titles.

People who play on more platforms are willing to pay more for AAA games. As each different gaming platform is quite expensive in itself, it is likely that people playing on more platforms simply have more money.

People who prefer more game genres are willing to pay more for indie titles. If a gamer is interested in a broader selection of games and game genres, the offer of AAA titles may not be enough for them in terms of variety.

Hardcore players are willing to pay a higher price than those "in between." As hardcore gamers tend to spend more time gaming than other people, it makes sense that they are willing to pay more. Moreover, their opportunity costs of gaming are also likely to be lower than for other gamers.

People who spend more time playing are willing to pay more. The explanation of this effect can be similar to why hardcore gamers are willing to pay more. They are likely to have lower opportunity costs and, at the same time, higher utility from gaming.

People who buy on release day are willing to pay more than those who buy in a year since release. Moreover, people who buy on sales are willing to pay less. It seems quite self-explanatory. However, some insight will be provided. It might be mainly due to the games' life cycles and their price developments. Most game developers and sellers follow similar pricing strategies. On release day, games start at full price. Within a year since release, their prices periodically drop a little (around 20%) when a "sale season" comes. Further on, the later in the game's life cycle, the higher discounts there are available for the game, sometimes as high as 80% sale. Allowing players who can not afford full-priced games to play older but much cheaper titles.

### **5.4.3 Limitations**

Due to the fact that the data collection took form on an online survey, certain limitations arise. First of all, the questionnaire was developed based on intuition and limited previous research, which might have led to the omission of certain relevant factors influencing the players' decisions.

Secondly, the survey was distributed solely through gaming-focused social media groups. Therefore, it targeted mostly players who either identify as gamers, have a sense of belongingness, or enjoy the social side of gaming. The gamers who feel no need to join these groups were excluded from the study, which might mean the sample does not represent the whole population of Czech and Slovak gamers. There was also a suspiciously low number of women in the sample, as already discussed in section 3.2; this is likely caused by the form of survey distribution as well.

Thirdly, as the respondents were free to decide whether to complete the survey or not, the self-selection bias may occur. At the same time, it is likely that some respondents did not report the actual maximum price they would be willing to pay but rather the price they are used to paying for the games. Moreover, there was nothing to stop the respondent from giving false or nonsensical answers. Even though the nonsensical answers were detected and removed with the data cleaning process, there was no way to recognise the false ones.

## 6 Conclusion

This thesis focused on the effect watching videogame streams has on the purchase decisions players make. Video game streaming has become a popular source of entertainment and information in the last few years. Especially since the outbreak of the Covid-19 pandemic, the numbers of viewers of the most popular streaming platform *Twitch* were rapidly rising, reaching more than 3 million concurrent viewers. (Twitch tracker, 2021)

Streaming is not only a huge phenomenon for entertainment purposes but also a great marketing tool. It has become common practice for game developers to provide streamers with free copies of their game or even pay them for playing it live. There is, however, a substantial difference between the AAA games and indie titles. Therefore, the research is aimed to underline these differences in the effect this form of marketing has on each game type. Furthermore, the maximum price the gamers are willing to pay for AAA or indie titles was explored and what variables influence it.

As both the streaming and the gaming industry are rather young and fast-growing, the research on these fields is limited. There are works focusing on their various aspects from the social point of view, and a few deal with consumer's willingness to pay for the games. However, they are targeted mainly at massively multiplayer games or mobile titles. The main motivations for this work were the lack of research connecting these two phenomena together, along with the focus on the domestic audience.

A self-developed questionnaire was used for data collection. In total, 990 responses formed the base dataset. For the purposes of verification, the data were then split in an 80:20 ratio into a training set and a test set. In order to determine the effect of explanatory variables on willingness to purchase a game based on watching a stream, two separate logit models were created and interpreted — one for the AAA games, the other for indie. Similarly, two standard OLS models were built to test the effects of explanatory variables on the maximum price a gamer is willing to pay for AAA or an indie title.

The logistic regression analysis found that being a student, watching streams and believing the streamer's opinion, and buying games mainly on release day increase the customer's probability of purchasing an AAA game after first watching it on stream. On the other hand, there was a significant negative relationship between the intention to buy after watching and buying games mainly on sale. Furthermore, watching streams and believing the streamer's opinion, a high number of preferred game genres, and a high number of games purchased yearly increase the probability of buying an indie title after watching it. There was also a negative effect of level of education and subscribing to the services providing free games on the purchase intention for the indie game.

The simple OLS model showed a significant positive relationship between the number of used platforms, being a hardcore gamer, hours spent gaming each day, buying games on release day, and the price customers are willing to pay for AAA games. On the other hand, being a man or a student and buying games mainly on sale negatively influenced the price consumers are willing to pay for AAA titles. Moreover, the variables representing the number of preferred genres and buying on release day increase the price the customers would pay for indie games. Higher age, being a student and buying games mainly on sale then decrease the price for indie titles.

The price for both AAA and indie games was also explored from the perspective of a monopolistic seller. Based on the demand and profit curves, the optimal prices would be between 1000 and 1500 CZK for AAA and 500 CZK for indie titles.

The work could be further extended by including the omitted portions of the gamer population, choosing a more effective way to collect data on the maximum price, either by auction or at least explaining to respondents the concept of willingness to pay. Furthermore, as the prices may not be entirely linear, a better approach might be to use a logarithmic transformation for the analysis. A more careful selection of explanatory variables would also be advised for any future research. For example, including a scale that would allow respondents to report the level to which each variable influences their decision or how much a certain attribute of the game is important to them. In the context of measuring the effect of marketing through streams, it would be ideal to get the sales data directly from the game developers and compare them with viewing numbers.

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# Appendices

## Appendix 1: Questionnaire in Czech

### Informace o hraní

*\*Povinné pole*

1. Na jakých platformách hrajete? \*

*Zaškrtněte všechny platné možnosti.*

- Počítač
- PlayStation
- Xbox
- Nintendo
- Mobil

Jiné:  \_\_\_\_\_

2. Jaké jsou Vaše oblíbené herní žánry? \*

*Zaškrtněte všechny platné možnosti.*

- Akční
- Adventury
- RPG
- Strategie
- Simulátory
- Sportovní

Jiné:  \_\_\_\_\_

3. Kolik hodin denně strávíte přibližně hraním? \*

\_\_\_\_\_

4. Za jaký typ hráče se považujete? \*

*Označte jen jednu elipsu.*

- Hardcore
- Casual

- Něco mezi
- Jiné: \_\_\_\_\_

## Streameři a YouTuberi

5. Sledujete streamy nebo záznamy her na YouTube? \*

*Označte jen jednu elipsu.*

- Ano
- Ne

6. Kolik dní v týdnu je přibližně sledujete? \*

\_\_\_\_\_

7. Kdo je Váš oblíbený herní Streamer nebo YouTuber? \*

\_\_\_\_\_

8. Co převážně sledujete? \*

*Označte jen jednu elipsu.*

- Úplné průchody celou hrou
- Sleduji spíše konkrétního tvůrce, bez ohledu na hru
- Jen část hry, která mě zajímá
- Jiné: \_\_\_\_\_

## Nákupní rozhodnutí

9. Kolik her si přibližně koupíte za rok? \*

\_\_\_\_\_

10. Hry kupujete převážně: \*

*Označte jen jednu elipsu.*

- Do roka od vydání
- Při jejich vydání
- Ve chvíli, kdy jsou ve slevě
- Využívám hlavně předplatná (Game Pass, PS+, ...)

11. Kolik jste ochotný/á zaplatit za velkou (AAA) hru? \*

\_\_\_\_\_

12. Kolik jste ochotný/á zaplatit za menší (indie) titul? \*

\_\_\_\_\_

13. Věříte názoru (na hru) Streamera/YouTubera, kterého sledujete? \*

*Označte jen jednu elipsu.*

- Ano
- Ne

14. Koupili byste si hru na základě jejich názoru/doporučení? \*

*Označte jen jednu elipsu.*

- Ano
- Ne

15. Na základě sledování videa nebo streamu byste koupili spíše: \*

*Označte jen jednu elipsu.*

- Hru, kterou lze projít více různými způsoby
- Hru, kterou jde projít jedním daným způsobem
- Nezáleží mi na tom

16. Velkou (AAA) hru si zakoupíte: \*

*Označte jen jednu elipsu.*

- Vždy

- Na základě sledování streamu/video
- Pouze pokud jsem stream
- nesledoval/aNikdy

17. Menší (indie) hru si zakoupíte: \*

*Označte jen jednu elipsu.*

- Vždy
- Na základě sledování streamu/video
- Pouze pokud jsem stream
- nesledoval/aNikdy

18. Na základě jakých dalších informací se rozhodujete o koupi hry? \*

*Zaškrtněte všechny platné možnosti.*

- Trailer, reklamy
- Profesionální recenze
- Hodnocení uživatelů
- Oblíbený žánr
- Důvěra v konkrétní studio
- Vyzkouším nejprve pirátskou kopii

Jiné:  \_\_\_\_\_

## Obecné informace

19. Kolik je Vám let? \*

\_\_\_\_\_

20. Jste \*

*Označte jen jednu elipsu.*

- Žena
- Muž

21. Jaký je Váš pracovní stav? \*

*Označte jen jednu elipsu.*

- Zaměstnaný
- Nezaměstnaný
- Student
- Důchodce
- Jiné: \_\_\_\_\_

22. Jaké je Vaše nejvyšší dosažené vzdělání? \*

*Označte jen jednu elipsu.*

- Základní
- Střední
- Vyšší odborné
- Vysokoškolské

23. Jaký je Váš měsíční příjem (v tisících)? \*

*Označte jen jednu elipsu.*

- méně než 20
- 20 až 25
- 25 až 30
- 30 až 35
- 35 až 40
- více než 40

## Appendix 2: Questionnaire in English

### Information about gaming

\*Mandatory

1. Which platforms do you use? \*

*Choose all that apply*

- PC
- PlayStation
- Xbox
- Nintendo
- Mobile
- Other: \_\_\_\_\_

2. What are your favorite genres? \*

*Choose all that apply*

- Action
- Adventure
- RPG
- Strategy
- Simulators
- Sports
- Other: \_\_\_\_\_

3. How many hours a day do you spend gaming? \*

\_\_\_\_\_

4. What type of gamer are you? \*

*Choose one.*

- Hardcore
- Casual
- Something in between
- Other: \_\_\_\_\_

## Streamers a YouTubers

5. Do you watch streams or gameplays? \*

*Choose one.*

Yes

No

6. How many days a week do you usually watch? \*

---

7. Who is your favorite streamer or YouTuber? \*

---

8. What do you mostly watch? \*

*Choose one.*

Full playthroughs

A specific person, no matter the game

Only a part of a game that interests me

Other: \_\_\_\_\_

## Purchase decisions

9. How many games a year do you buy? \*

---

10. I buy games mostly: \*

*Choose one.*

- At launch
- Within a year since launch
- If they are on sale
- I mostly use subscriptions (Game Pass, PS+, ...)

11. How much are you willing to pay for a large game? \*

---

12. How much are you willing to pay for a smaller game? \*

---

13. Do you believe the opinion of a streamer or a YouTuber? \*

*Choose one.*

- Yes
- No

14. Would you buy a game based on their recommendation? \*

*Choose one.*

- Yes
- No

15. Based on watching a video or a stream, would you rather buy: \*

*Choose one.*

- A game with several possible walkthroughs
- A game that has one possible walkthrough
- It doesn't matter

16. You would buy a big (AAA) title: \*

*Choose one.*

- Always
- Based on a stream or gameplay video
- Only if I haven't watched a stream
- Never

17. You would buy a smaller (indie) title: \*

*Choose one.*

- Always
- Based on a stream or gameplay video
- Only if I haven't watched a stream
- Never

18. Based on what other information do you decide to buy a game? \*

*Choose all that apply*

- Trailer, ads
- Professional review
- User review
- Favorite genre
- Trust in a specific studio
- I try a pirate copy first
- Other: \_\_\_\_\_

## **General information**

19. How old are you? \*

\_\_\_\_\_

20. You are: \*

*Choose one.*

- Male
- Female

21. What is your working status? \*

*Choose one.*

- Employed
- Unemployed
- Student Retired
- Other: \_\_\_\_\_

22. What is your highest level of education? \*

*Choose one.*

- Primary
- High school
- College
- Univerisity

23. What is your monthly income (in thousands CZK)? \*

*Choose one.*

- Less than 20
- 20 to 25
- 25 to 30
- 30 to 35
- 35 to 40
- More than 40