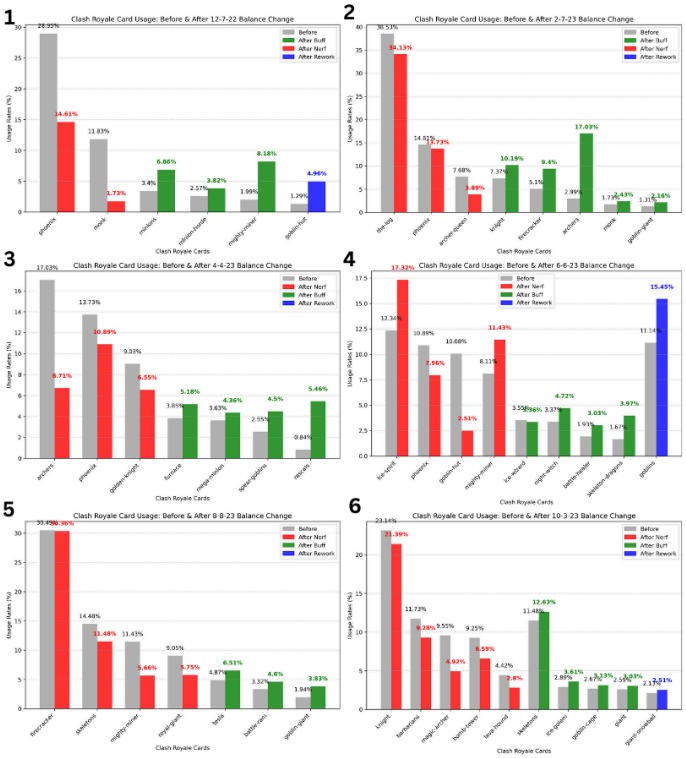
Meta Shifts in Clash Royale: Analyzing the Impact of Balance Changes on Card Usage and Top Deck Trends

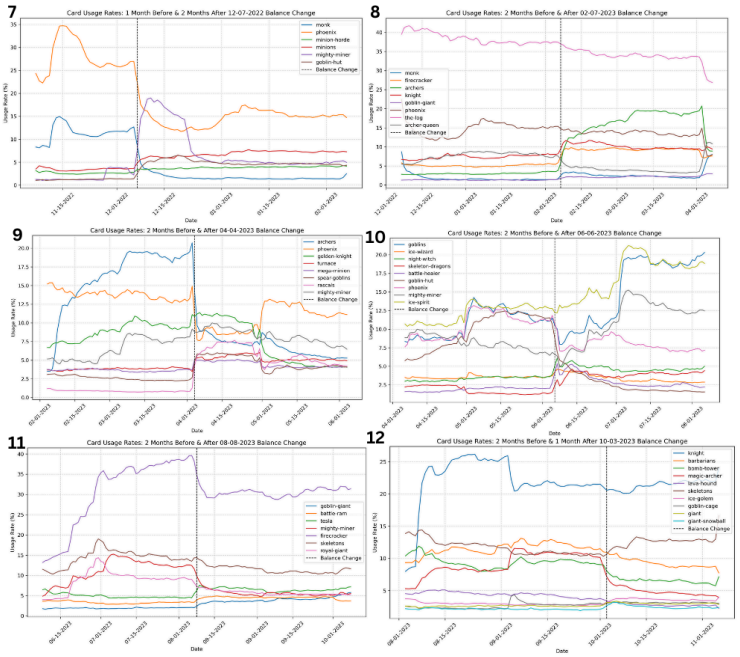
As a Clash Royale player myself, I wanted to analyze how balance changes affect card usage rates. I utilized a comprehensive Kaggle dataset comprising 481 million Clash Royale matches to do this. For my analysis, I focused on the composition of decks, each consisting of 8 unique cards, to evaluate trends and shifts in card popularity following balance updates. The match data ranged from 09-05-2022 to 11-06-2023. Looking at the change log history on the Clash Royale wiki, I found that there were 6 balance changes between those dates, each spaced 2 months apart. However, due to the dataset's date constraints, the first balance change includes only one month of pre-change data, and the last balance change includes only one month of post-change data. Additionally, I manually looked at the individual card changes per balance change and labeled the cards as buffed or nerfed depending on whether a certain attribute (attack speed, health points, elixir cost, etc) was increased or decreased.

My initial hypothesis was that buffed cards would see a significant increase in usage while nerfed cards would decline. Although I found that buffed cards did gain usage and nerfed cards lost usage, the decline in usage for nerfed cards was much more pronounced than the increase for buffed cards, highlighting that nerfs had a more dramatic impact on card popularity. In the data, buffed cards experienced an average absolute change of +2.38% and a significant relative change of +100.74%—effectively doubling their usage. Conversely, nerfed cards showed a larger average absolute decline of 4.44% and a relative drop of 35.43%. This comparison clearly illustrates that while buffs do boost usage, the impact of nerfs is considerably more impactful in reducing card popularity. This makes sense as nerfed cards, in most cases, tend to have higher pre-nerf usage rates than buffed cards, which explains how they could have a higher absolute decline but only about a third of the relative change in usage rate compared to buffed cards. While nerfs typically result in lower usage rates, two notable exceptions emerged.

As shown in Figure 4, the Ice Spirit experienced a 5% increase in usage post-nerf, and the Mighty Miner saw a 3.3% boost. Upon reexamining the nerfs, I noted that the Ice Spirit's freeze duration was reduced from 1.3 seconds to 1.2 seconds, and the Mighty Miner's HP was decreased by 2.2%. The Mighty Miner's HP nerf was minor compared to the most significant change—a 13% HP decrease for the Phoenix card. The Ice Spirit's freeze effect's primary benefit is stopping attacks and the damage dealt to both units and towers, so the change is negligible. The minimal nature of these changes explains how these cards did not suffer a large drop in usage because their core stats remained relatively the same. Pre-nerf, the Ice Spirit was only in the 2nd and 3rd top meta decks, and the Mighty Miner appeared only in the 8th. After the nerfs, Mighty Miner usage surged—appearing in the top first and fourth deck one month and appearing in the top two, fourth, and eighth decks the next. Ice Spirit consistently secured a spot in four of the top five meta



decks for those next two months. In the first post-balance month, the top two meta decks were used nearly 1.83 million and 1.18 million times, dwarfing the others (350K–664K). In the following month, these figures rose to over 2.33 million and about 1.08 million, illustrating the dominance of these decks. The Ice Spirit's inclusion is likely due to it being one of only five one-elixir cards in Clash Royale, and its unique freeze effect enables fast cycling and effective play. Additionally, the Mighty Miner has the unique effect of being able to go underground. The inclusion of the Mighty Miner and Ice Spirit in top meta decks after their balance changes both promotes and helps explain their increased usage, as many players refer to these meta decks for guidance on card selection and deck optimization.



I also examined the immediate changes in card usage rates following the balance updates, which are visualized in Figures 7-12. Figure 7 clearly shows that the sharpest declines in usage occurred with the Phoenix and the Monk. Unlike the more minor adjustments to the Mighty Miner and Ice Spirit, these cards underwent the harshest nerfs: the Monk's elixir cost increased from 4 to 5, and the Phoenix's health was reduced by 13%. This health reduction is more than double the next largest change observed in any other card, underscoring how such a drastic adjustment led to a steep decline in usage immediately after the balance changes. Notably, the Monk was the only card among those updated that had its elixir cost modified, and the increase contributed to its plummeting usage as players tend to keep their overall deck elixir costs down in order to not get out-cycled by opponents. Figure 8 illustrates the Archers' dramatic climb in usage rates following the balance change, visualizing the largest absolute increase at 14.04% and the second highest relative surge at 570%. This was largely due to its huge decrease in attack speed—from 1.1 seconds to 0.9 seconds, a 22% improvement—which, when combined with its low elixir cost of 3, enabled Archers to win in many post-balance interactions.

In conclusion, balance changes in Clash Royale have large impacts on card usage rates, influencing which individual cards appear in decks due to altered card utility and competitive meta shifts. Buffed cards generally saw slight increases, while nerfed cards experienced steeper declines overall—even though some cards, like the Ice Spirit and Mighty Miner, actually gained usage despite minor nerfs, thanks to their unique utility and low cost. The meta deck data further shows this with the top two decks maintaining usage frequencies that far exceeded the others, highlighting how certain combinations drive the competitive meta. Moreover, the severity of the balance change has a direct impact: the steep drops for the Phoenix and Monk reflect their harsh nerfs in health and elixir cost, while the major decrease in attack speed for the Archers led to a significant usage surge. Ultimately, these findings demonstrate that the magnitude of balance changes can dramatically shift the game—either sidelining cards with severe nerfs or boosting others into key roles thanks to newfound utility.