FinTech & Social Media: Should PayPal Acquire Pinterest?

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Keywords: PayPal, Pinterest, acquisition, discounted cash flow, digital payment

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Acknowledgments

I would like to express my sincere gratitude and appreciation for my Signature Work mentor, Professor Luyao Zhang, whose support and guidance have helped and encouraged me throughout my research and writing process. I also want to extend a heartfelt thanks to the Duke Financial Economics Center (DFE) who not only fostered my passion for finance but also provided me with unparalleled resources. Lastly, I would like to stress that all errors in this research remain to be mine and I take full responsibility for all aspects of my Signature Work product.

Research Summary

Abstract:

Increased competition in the fintech industry has forced PayPal to rethink its business model. More specifically, the San José-based company aims at replicating what We Chat and Alipay have successfully done in China by building an ecosystem in which users can have access to different services. In order to shift away from a payment platform to a digital commerce gateway, PayPal has been pursuing multiple strategic acquisitions that can help the company expand its services as well as its international market share. One merger deal that attracted particular attention from media and investors was the proposed acquisition of the social media Pinterest, which was later called off after investors negatively reacted to the stock market. This paper argues that PayPal's shareholders missed a unique opportunity to create value. We will use a discounted cash flow analysis to estimate whether PayPal's earning per share would have increased or not after merging with Pinterest.

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Part I: Research Description

1. Introduction

On October 24th, 2021, PayPal Holdings Inc. stated in a public release that "it was not pursuing an acquisition of Pinterest at this time" (PayPal, 2021[1]). Although PayPal has never officially announced a proposed acquisition of Pinterest, information leaked on October 20th when Bloomberg reported that the two companies were considering a merger privately (Bloomberg, 2021[2]). Insider trading activity was already observable after Pinterest's stock price rose by 19 percent just during the five days preceding the deal leak. The merger rumor ended up hurting both stocks and it should have never come out. As shown in the graph below, by the time PayPal backed off the potential takeover on October 25th, its shares have already fallen by 4.65 percent from $258.36 to $246.88, while Pinterest has lost its previous 19 percent gain entirely. In this paper, I argue that PayPal should have acquired Pinterest for the proposed $39 billion as the price implied a positive net present value (NPV) of the merger.

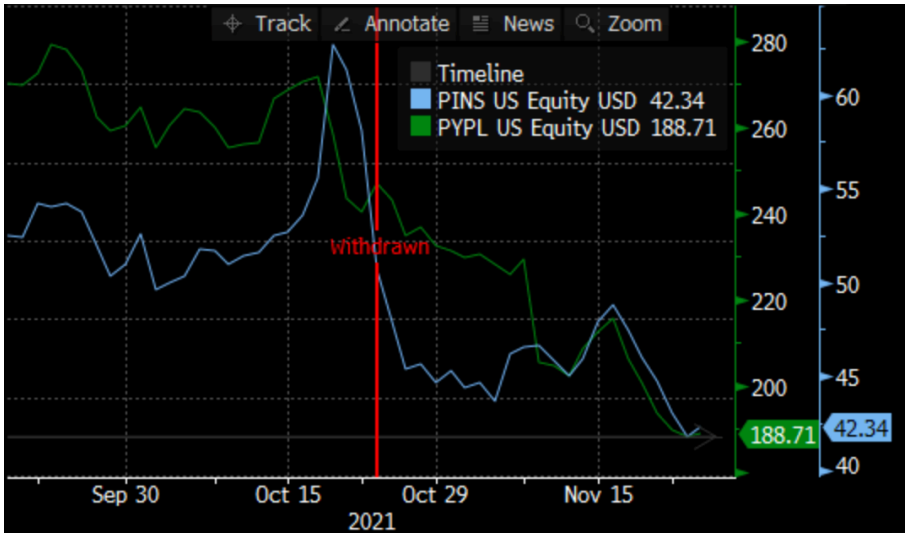

Figure 1: PayPal and Pinterest's stock prices Source: Bloomberg

The reasons why a merger between PayPal and Pinterest could have potentially added significant value lie in the complementarity of their business models. Although PayPal and Pinterest operate in completely different industries, both companies envision an interconnected digital future where users can easily find products or services and buy them. PayPal does not just want to be a payment

platform as much as Pinterest does not just want to inspire ideas. Both companies aim at becoming a service platform, even though they have different ideas on how to monetize it.

PayPal, on the one hand, makes most of its money from transaction fees, including its checkout options, P2P payments, direct deposits, QR codes payments, and crypto investing. Since its foundation in 1998, PayPal has been able to increase its global market share to 49 percent of the payment processing segment, which is valued at $40 billion in 2020 and estimated to reach $176 billion in 2026 (ResearchandMarkets, 2021[3]). Despite its market leadership, PayPal faces increasing competition from smaller fintech companies like Square, which has grown in popularity especially during the pandemic due to its highly engaging Cash App. It seems that the future of PayPal heavily depends on its ability to increase the number of active users as well as their engagement, defined as the total payment volume per active user. The San Jose-based company has been trying to replicate what Alipay and WeChat have done in China and build a "super app" (PayPal, 2021[4]) that can provide users with multiple services ranging from discount coupons, buy-now-pay-later (BNPL) services, and crypto investing. To implement this strategy, PayPal has leveraged its high cash and low debt balance sheet and acquired discount finder Honey Inc. in 2019 and Japanese BNPL Paidy earlier this year. However, the integration expenses of these companies seem to have outweighed the benefits for now. Investors have accused PayPal of lacking a solid plan on how it will address its online monetization problem (CNBC, 2021[5]). Acquiring a social media platform could be attractive for PayPal for two reasons. Firstly, it could significantly expand PayPal's active user base, which is reported to be 416 million in Q3 2021. Secondly, a social media platform could help combine different payment solutions into a single venue where users can easily find products and buy them, resulting in higher average revenue per user (ARPU).

Pinterest, on the other hand, draws most of its revenues from selling ads, especially Promoted Pins. The company has a truly global network with 444 million active users, 80 percent of whom live outside the US (Business Wire, 2021[6]). Although US users represent only 20 percent of the total user base, they accounted for roughly 80 percent of the company's revenue in Q3 2021. Pinterest has become very popular during the Covid-19 pandemic among US mothers and millennials, though engagement has decreased since restrictions were lifted. The San Francisco-based

company has responded to slower user growth by launching new innovative products, including augmented-reality try-ons and video content. The biggest challenge for Pinterest seems to be the monetization of its user base. According to Bloomberg, major competitors like Instagram and Meta have almost 6 times its ARPU due to a bigger advertisement base (Bloomberg Terminal). Users may use Pinterest to find new items, but they do not seem to have purchasing intent ultimately. A merger with a payment company like PayPal would help boost sales in two ways. Firstly, it would increase the credibility of the brand, resulting in more users finalizing the purchase. According to a report by Retail Touchpoints (2021[7]), 43 percent of consumers do not trust social media platforms to manage payment processing. Integration with PayPal could then lead to higher customer loyalty and retention rates. Secondly, PINS could increase its users' willingness to buy by offering them different payment solutions, including BNPL and discount coupons.

2. Literature Review

Before evaluating whether PayPal should have acquired Pinterest, it is necessary to provide some context to the reader about mergers and acquisitions (M&A). Researchers around the world have paid particular interest in M&A events as a subject of study since the 1920s. This is because an M&A event can be a good opportunity to extrapolate the intrinsic value of a firm by examining how much another market participant is willing to pay for it. An analysis of an M&A event can also give us more information on whether the transaction could have created value or not. In other words, two companies need to be worth more together than apart for an M&A transaction to add value (Brealey et al., 2020).

An M&A transaction can take different forms that range from a merger, a tender offer, a consolidation to an acquisition of assets. According to Damodaran (2012), a merger can be defined as the integration of the target firm into the acquiring firm. In order for two companies to merge, their respective boards of directors must agree by a majority vote and seek stakeholders' approval for the combination. A real-life example of a merger can be represented by Disney's successful acquisition in 2006 of Pixar, which later became Disney's subsidiary. A tender offer, on the other hand, implies that the acquiring firm purchases the outstanding stock of the target company at a

determined price. This type of transaction represents a way through which the acquiring company can make an offer to the target firm's shareholders without involving its board of directors. If the offer is accepted by the target firm's shareholders, then the new owner is allowed to make changes in the management. Oracle's hostile takeover in 2003 of its rival PeopleSoft is an example of a tender offer. In a consolidation, a new firm is created by combining the acquiring firm with the target firm. After consolidation, the firms involved in the transaction no longer exist. Citigroup, for example, was formed after the consolidation of Citicorp and Travelers' Insurance Group. Lastly, the acquisition of assets involves the transfer of assets from the target company to the acquiring firm. The shareholders of the target company will still need to accept the transaction through a formal vote. When rumors came out that PayPal was considering acquiring social media Pinterest, the transaction would have been most likely a merger as active discussions between the two boards of directors were happening in a friendly fashion, according to the Wall Street Journal (2021). We can then exclude the possibility of a tender offer, or a hostile takeover, from PayPal.

Firms have different motives to acquire or combine with another company, but all of them share the same broader objective. As Sui et al. (2016) argues, companies with solid financial and leverage capabilities see a merger as a good opportunity to grow faster than organic business growth. For instance, a firm might have a stringent need to improve its international market position or increase competitiveness in the short term. Then a merger can help the company achieve its objective by providing access to a market with lower cost than having to start from scratch internally. When a firm carries out a merger, it then gains direct or indirect access to technology, knowledge, and competent management that can be leveraged to efficiently increase the acquiring firm's competitive advantage over the industry (Akram et al., 2016). Brealey et al. (2020) went even further and highlighted five main motives for a merger. First, a merger can be an attractive option for companies that aim at reducing costs and achieving economies of scale. The average unit cost of production can be reduced by spreading fixed costs of the two companies, including rent, office management and accounting, and top-level management, over production. Second, two firms may have complementary resources which may open up to growth opportunities that would have not been available to them otherwise. For instance, a small firm that lacks the engineering and sale organization may find it quicker and cheaper to merge with a bigger firm that already has those capabilities rather than developing them from scratch. The third motive is often

associated with mature companies that want to avoid distributing their surplus cash to shareholders and lack good project opportunities. A merger then becomes attractive to a mature firm as it allows for an alternative way to deploy its surplus capital. Lastly, a merger can help improve efficiencies in highly fragmented industries. The financial services industry, for example, has been characterized by a huge number of small failing banks that in most cases ended up merging with stronger and larger rivals as part of a bail-out strategy. It is worth noting that the four motives abovementioned do not have to be mutually exclusive. A firm can be carrying out a merger for a combination of different reasons. PayPal, for instance, initiated the discussion of a potential merger with Pinterest because not only does it have excess cash to be deployed but also it lacked Pinterest's know-how in the social media industry.

A company that is highly motivated to carry out a merger must also understand how the transaction can create value. It can be said that motivations are necessary but not sufficient. A firm must remain confident, especially about its ability to implement the business plan and add value. According to Martin et al. (1997), control and synergies are perhaps the only two fundamental sources of value in a merger. When the acquiring firm gains control of the target company, it can effectively change the status quo of the latter, including its poor management practices. The acquiring firm, for example, might be reluctant with the current capital structure of the target firm. Thus, by altering the target firm's leverage and enhancing its capital discipline, the acquiring firm believes that it can generate value due to better management practices. So, as Shivdasani et al. (2007) suggest, the opportunity to improve the poor performance of the incumbent management by making business decisions represents a critical source of value for the acquiring firm. Similarly, synergies – defined as the potential additional value from combining two firms – also represent a fundamental generator of value in a merger. According to Damodaran (2012), operating synergies refer to those synergies that either enhance revenues or reduce costs. For revenue enhancement, it could be originated from penetrating new markets or launching new products by leveraging an already established distribution market as well as existing brand recognition. The combined firm could then benefit from these operating synergies and increase its margin and growth. Regarding cost reduction, a merger allows the combined firm to be more cost-efficient and increase its profit margins. Additionally, cost reduction programs are particularly attractive to firms as they can be executed almost as soon as the merger is completed. Companies are generally more successful in

cutting costs than generating additional revenue, which may instead be affected by competitors and customer reaction (Sirower et al., 2006). Financial synergies can also represent a source of value in a merger. More specifically, Damodaran (2012) suggests that companies can benefit from financial synergies either through higher cash flows or lower discount rates. For instance, a merger can generate substantial value when a firm with surplus cash yet low-return projects combine with a firm with a higher return on projects but limited cash.

The empirical evidence on the existence of synergies is quite extensive and provides some insightful conclusions on the nature of most M&A transactions. Researchers have long relied on the observation of the stock market to quantify synergies *a posteriori*. In other words, if the value of the combined firm is consistently higher than the stand-alone values of the two firms across most transactions, then we can accept the notion that synergies do exist. To address this question, Bradley et al. (1988) examined nearly 273 tender offers between 1963 and 1983 and concluded that on the date of a merger announcement the combined value of the target and acquiring firms increased by 7.4 percent, on average. Also, Devos et al. (2009) analyzed a sample size of 264 large mergers between 1984 and 2004 and estimated the average synergy gains to be as high as 10 percent of the combined equity value of the merging firms with almost 8.4 percent coming from operating synergies and 1.6 percent from financial synergies (i.e., tax savings). Within these operating synergies, a cut on investment expenditure (i.e., cost reduction) seems to have played a more significant role than increases in operating profits (i.e., revenue enhancement). However, such empirical evidence should be taken *cum grano salis*. Although target firm shareholders on average earn returns of from 20 to 40 percent in the form of lofty merger premiums – i.e., the difference between the price offered by the acquiring firm and the target firm's market value, it is less clear whether acquiring firms earn positive returns at all (Mulherin et al., 2000). According to Andrade et al. (2001), the abnormal returns that are realized by acquiring firms following mergers transactions are negative or nonexistent at best. Nevertheless, more recent studies have shown that acquiring firms do gain positive returns in competitive markets, such as the US, the UK, and Canada, where mergers premiums are reportedly lower. In these markets, target firms enjoy lower abnormal returns as merger gains are more evenly split among the merging companies (Alexandridis et al., 2010).

3. Data Descriptor

Data Source

To perform our analysis of whether PayPal should have acquired Pinterest, our dataset is extracted solely from the Bloomberg Terminal. The Bloomberg Terminal is a computer system that provides news, price quotes, and financial information covering all market sectors. Both PayPal and Pinterest are publicly traded companies on the New York Stock Exchange. Therefore, the U.S. Securities and Exchange Commission (SEC) requires them to disclose annual reports, including certain types of business and financial data. More specifically, annual reports to stockholders must contain certified financial statements, from which this paper draws all the relevant data for the analysis. In addition to that, publicly listed companies must comply with the Securities Act of 1933 – also known as the "Truth in Securities" law – which ensures transparency in financial statements to protect investors from fraudulent activities in the securities market. The Bloomberg Terminal gathers all this information spanning more than 20 years and distributes them to professionals as well as researchers in the financial market.

Variable name	Description	Unit	Frequency
`Name`	The name of the stock or index fund	/	/
`Price`	Adjusted closing price	USD	Monthly
`Date`	The date when price is recorded	/	Monthly
`Returns`	The change in price of an asset over the preceding month	%	Monthly
`Revenue`	Total amount of income generated by the sale of goods or services	USD	Annual
`Free cash flow`	Operating cash flow minus capital expenditures	USD	Annual

Market capitalization	Price per share times number of shares outstanding	USD	Monthly
Active accounts	Number of active accounts	/	Annual
Average revenue per user (ARPU)	Total revenue divided by number of active accounts	USD	Annual

Data Import

The Bloomberg Terminal allows its users to automatically export data on Excel worksheets. Therefore, this paper did not require external platforms to integrate different datasets. The data exported on Excel include:

1. PayPal's income statement, balance sheets, and cash flow statement from fiscal year 2016 to fiscal year 2020.
2. Analysts' average estimates of PayPal's revenue and active accounts from 2021 to 2026.
3. PayPal's monthly stock prices from October 21st, 2016, to October 21st, 2021, which is the date when PayPal called off the merger with Pinterest.
4. S&P 500 Index (NYSE: GSPC)'s monthly prices from October 21st, 2016, to October 21st, 2021.
5. Pinterest's income statement, balance sheets, and cash flow statements from fiscal year 2019 to fiscal year 2020.
6. Analysts' estimates of Pinterest's revenue and active accounts from 2021 to 2026.

Data Visualization

Figures 2 and 3 show revenues and the number of active accounts for PayPal and Pinterest as recorded in their annual reports from 2016. It can be noted that the graphs also include estimates until 2026. These estimates are exported from the Bloomberg Terminal, which takes the average of different Wall Street analysts' projections based on public and proprietary information.

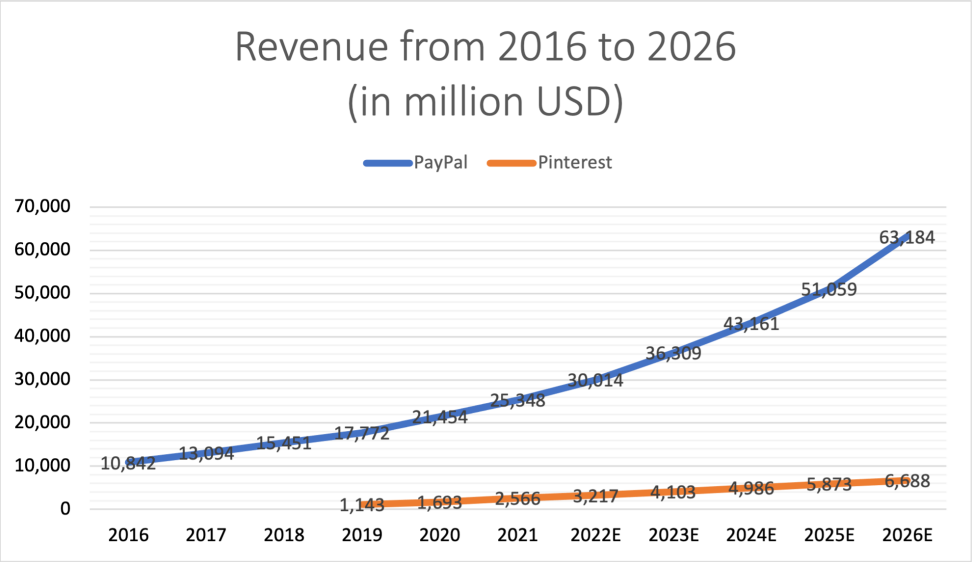

Figure 2: Time-series revenue data from 2016 to 2026

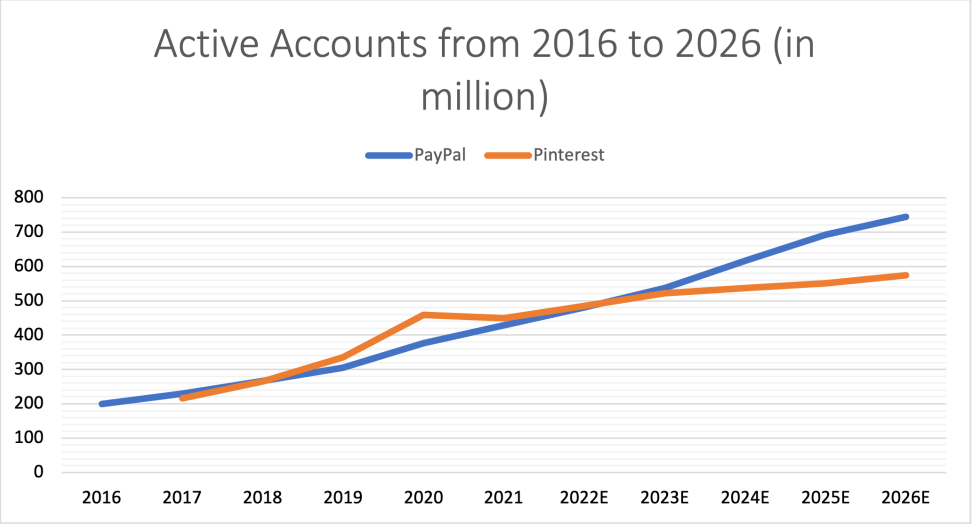

Figure 3: Time-series active accounts data from 2016 to 2026

Figure 4 shows the monthly returns, calculated as the percentage change in stock prices from one month to the other, of PayPal and the S&P 500 Index in the period between October 21st, 2016, and October 21st, 2021.

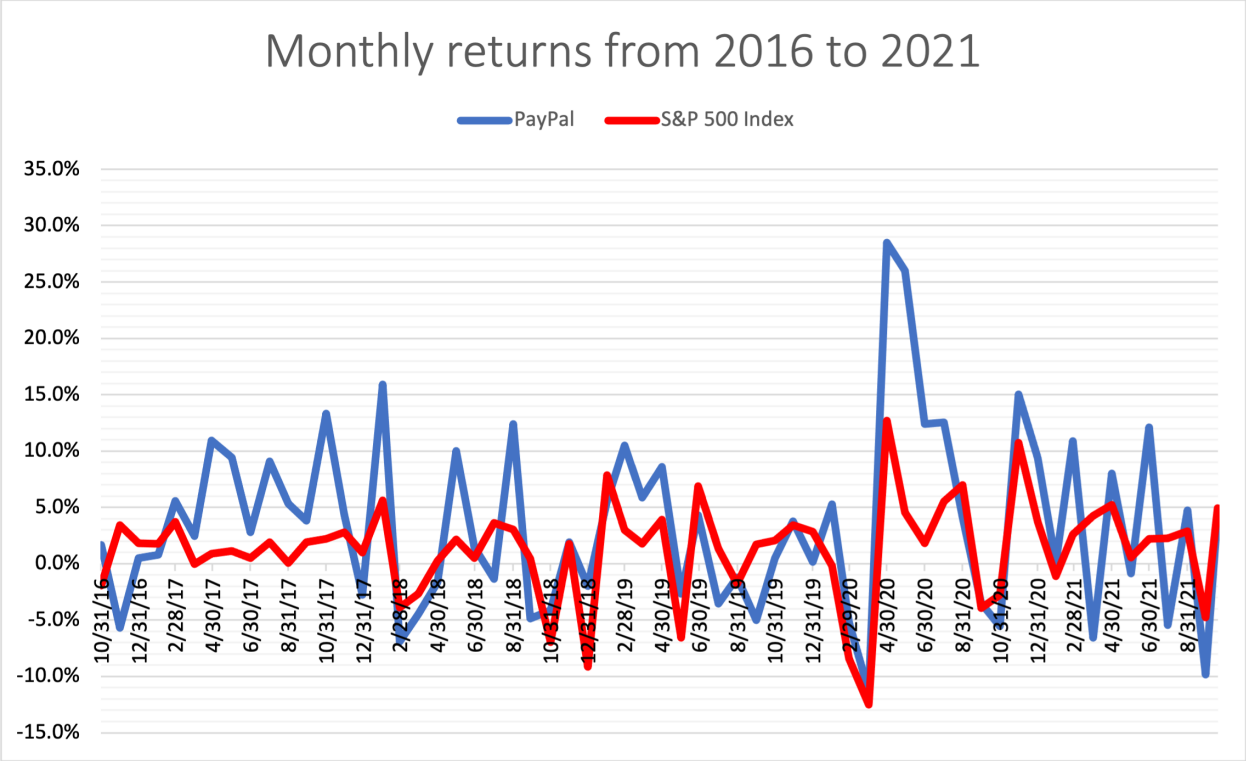

Figure 4: Monthly returns on PayPal and S&P 500 Index from 2016 to 2021

4. Methodology

In this section, I describe the valuation methodology used to estimate whether the PayPal-Pinterest deal could have been accretive or dilutive in nature. According to Brealey et al. (2020), a merger can generate an economic gain if and only if the two combining firms are worth more together than apart – often referred to as '1+1=3'. Therefore, if we suppose that the combined firm would be worth $PV(PYPL + PINS)$, and that the separate firms are worth $PV(PYPL)$ and $PV(PINS)$, then the merger gain is given by the following equation:

$$Merger\ gain = PV(PYPL + PINS) - [PV(PYPL) + PV(PINS)] = \Delta PV(PYPL + PINS)$$

Thus, if the merger gain is positive (i.e., $\Delta PV(PYPL + PINS) > 0$), then the merger can be justified economically. $\Delta PV(PYPL + PINS)$, or the merger gain, represents the present value of

the cash flows generated by the acquisitions. On October 19th, 2021, PayPal's stock price was $271.70 and its shares outstanding amounted to 1.1749 billion (X_{PYPL}), which resulted in a market capitalization of $319.22 billion. On the other hand, Pinterest was trading at a price of $55.58 and it had 562.7 million shares outstanding, implying a market capitalization of $31.28 billion. Therefore,

$$PV(PYPL + PINS) = \$319.22B + \$31.28B + \Delta PV(PYPL + PINS)$$

In accordance with much of the corporate finance literature, this paper will also use a discounted cash flow (DCF) model to estimate the merger gain $\Delta PV(PYPL + PINS)$. Our DCF model will include two stages: the forecast period and the terminal value. In the forecast period, we will project out future free cash flows from 2022 to 2026. A five-year projection future represents a reasonable assumption in our model as the combined firm will likely enjoy a competitive advantage in this period. On the other hand, the terminal value will reflect the additional free cash flow beyond 2026. In such a two-stage free cash flow model, the growth rate in the first stage is based on the average estimates made by analysts on different variables from 2022 to 2026. The growth in the second stage is a long-run sustainable growth rate, which is expected to grow faster than GDP because of the high growth potential of the digital payment/e-commerce industry. Free cash flow to the firm (FCFF) comprises the cash available to the combined firm's capital suppliers after all operating expenses and necessary investments are paid. So, FCFF is calculated using the following equation:

$$FCFF = Operating\ cash\ flows - \Delta\ Net\ Working\ Capital - Capex$$

To project future cash flows, we will first estimate the effect of the merger on the revenues for both companies. This is basically an extra revenue that could be generated if and only if PayPal would acquire Pinterest. Once we have our additional sales projected into the future, we can multiply them by the 5-year average free cash flow margin (i.e., free cash flow divided by total revenue) to get the free cash flow for each year in our two-stage growth model. According to PayPal's financial statements, the average free cash flow margin during the past five years was 22 percent and we will assume that this ratio stays constant in the future. Although this may sound

like an underestimate as companies usually increase the ratio over time, it is a fair assumption because it also accounts for some delays in the integration process of Pinterest. In fact, our model assumes that PayPal will be able to benefit from the additional revenue starting from 2022, even though this may not be the case as integration can take more time. Throughout our model, we will use a basic formula for FCFF that can be applied both to PayPal and Pinterest. Thus,

$$FCFF = Revenue \times FCF\ Margin = (number\ of\ active\ accounts \times ARPU) \times 22\%$$

Once we projected FCFF in our two-stage growth model, it is necessary to derive an appropriate discount rate. The question of which discount rate is more appropriate remains of great interest for many academics as well as professionals. More specifically, Rappaport (1979) suggests that the appropriate discount rate in an M&A transaction is the acquirer's cost of capital, which is calculated as a weighted average of the cost of equity and debt. However, a weighted average cost of capital (WACC) may not be the optimal discount rate when the acquirer and the acquisition candidate have different risk profiles. As a result, Rappaport (1979) argues that when the acquirer's specific riskiness is affected by its acquisition, it is safer to use a more conservative discount rate that captures the highest risk. Therefore, this paper will use the cost of equity r_e of the acquiring firm as the baseline discount rate r to include the extra risk associated with the merger transaction. A common approach to estimate the cost of equity is to invoke the Capital Asset Pricing Model (CAPM). According to Bodie et al. (2019), CAPM, a model first proposed by Sharpe (1964) and Lintner (1965), describes the relationship between a required rate of return on a security to its systematic risk, which is often referred to as beta (β). Therefore, the cost of equity is given by the following equation:

$$r_e = r_f + \beta[E(r_m) - r_f]$$

where r_f is the "risk-free" rate, β stands for the security's systematic risk, and $E(r_m) - r_f$ represents the market risk premium, or the difference between the expected return on the market and the risk-free rate. Academics and practitioners seem to have a different inclination towards risk-free rates, where the former tends to prefer short-term Treasury bills (i.e., 3-month T-bill) and the latter tends to use long-term Treasury notes (i.e., 10-year T-note). According to Damodaran

(2008), the best proxy for a risk-free rate is a default-free (government) zero-coupon rate whose duration is matched up to the duration of the cash flows being analyzed. Therefore, in corporate finance a long-term government bond rate is generally regarded as the appropriate risk-free rate. In this paper, we will use a US 10-year government bond yield as the best proxy for our risk-free rate. However, it is worth noting that the US 10-year Treasury yields are extremely low due to quantitative easing (QE) programs adopted by the Federal Reserve System – hereafter referred as to the Fed. Therefore, we will use a more conservative 4 percent long-term average yield on a 10-year government bond to adjust for a highly volatile interest rate environment, in accordance with most of the corporate finance literature (Brealey et al., 2020). The market risk premium $E(r_m) - r_f$, defined as the difference between the expected market return and the risk-free rate, also represents a crucial component in our CAPM equation. A standard approach in corporate finance for estimating the market risk premium is to make an informed projection based upon how well a stock index has done in the past (Damodaran, 2018). More specifically, this paper will measure the market risk premium as the historical return differential between the S&P 500 Index and the US 10-year government bond. Lastly, the systematic risk, or β, represents the correlation coefficient between the excess returns of PayPal and the S&P 500 Index. In order to estimate this coefficient, we will run an ordinary least squares (OLS) regression between the monthly excess returns on PayPal and the monthly return on the S&P 500 Index. After having estimated the risk-free rate, the market risk premium, and the beta, we can use the cost of equity to discount the projected extra free cash flows to the firm generated by the combined firm.

Extra free cash flows can be generated from 4 different sources. Two strategies aim at increasing PayPal's active accounts, whereas the other two increase Pinterest's ARPU. We will discount these four different free cash flows back to the present and then sum them together to estimate our merger gain $\Delta PV(PYPL + PINS)$. Let's walk through them one by one:

1. New PayPal active accounts from Pinterest's user base in the US

In this scenario, we consider that a fixed proportion of Pinterest's online shoppers will start adopting PayPal for the first time and ultimately add to PayPal's active accounts. We assume that 20 percent of Pinterest's frequent online shoppers (FOS_{PINS}) that use PayPal as a payment method

will also become new active users on PayPal. So, the number of additional PayPal active accounts ($New\ AAs_{PYPL}$) in the US is given by:

$$New\ AAs_{PYPL} = AAs_{PINS,US} \times \%\ of\ FOS_{PINS,US} \times conversion\ rate_{PYPL} \times \%\ of\ new\ AAs_{PYPL}$$

The number of Pinterest's active accounts in the United States ($AAs_{PINS,US}$) is estimated to be 92 million in 2022, according to Bloomberg. In addition to that, the company reported that 50 percent of its US users frequently shop on Pinterest (Pinterest, 20218), while 87.5 percent of online buyers use PayPal ($conversion\ rate_{PYPL}$), according to a study by ComScore (20169). Thus, the number of additional PayPal accounts in 2022 is:

$$New\ AAs_{PYPL} = (92M) \times (50\%) \times (87.5\%) \times (10\%) = 4.025M$$

To translate the number of new PayPal's active accounts into an extra free cash flow we need to multiply it by the ARPU of PayPal first and then by the 22 percent free cash flow margin. The ARPU of PayPal in 2022 is the ARPU in Q3 2021 (i.e., $59.2 per user) multiplied by an average growth rate of what analysts think ARPU will grow from 2022 to 2026 (i.e., 7.5 percent according to Bloomberg). So, extra free cash flow in 2022 is:

$$FCF_{2022} = New\ AAs_{PYPL} \times ARPU_{PYPL,2021} \times (1 + ARPU_{PYPL}\ growth\ rate) \times FCF\ margin$$

The growth rate of the free cash flows in the first stage (i.e., from 2022 to 2026) represents a combination of PayPal's ARPU growth rate ($ARPU_{PYPL}\ growth\ rate$) and Pinterest's active accounts growth rate in the US ($AAs_{PINS,US}\ growth\ rate$). ARPU and Pinterest's active accounts are the only variables that will increase in the next five years, while the percentage of Pinterest's online shoppers, the percentage of new PayPal active accounts, and PayPal's conversion rate remain constant. PayPal's ARPU growth rate and Pinterest's active accounts growth rate are calculated by taking an average of analyst expectations in the next five years on Bloomberg. In the second stage, we assume a growth rate of 4 percent, slightly higher than the US GDP growth rate

because the digital payment/e-commerce industry is expected to grow faster than the overall economy (ResearchandMarkets, 20213). Thus,

$$g_s = (1 + \ ARPU_{PYPL}\ growth\ rate\ ) \times \left(1 + AAs_{PINS,US}\ growth\ rate\right)$$

and,

$$g_l = 4\%$$

So,

$$PV_1 = \frac{FCF_{2022}}{1+r} + \frac{FCF_{2023}}{(1+r)^2} + \frac{FCF_{2024}}{(1+r)^3} + \frac{FCF_{2025}}{(1+r)^4} + \frac{FCF_{2026}}{(1+r)^5} + \frac{FCF_{2027}}{(r-g_l)(1+r)^5}$$

2. New PayPal active accounts from Pinterest's user base outside the US

The idea for these extra free cash flows is the same as the previous one, but we will shift geographic focus from the US to the rest of the world. The underlying assumptions will change because Pinterest reports different statistics outside versus inside the US. According to Bloomberg, Pinterest's active accounts outside the US are estimated to be 361 million in 2022 ($AAs_{PINS,OUT,2022}$), which are expected to grow at 5.8% ($AAs_{PINS,OUT}\ growth\ rate$) from 2022 to 2026, on average. In fact, the company believes that it can grow its international user base much faster than in the US. However, Pinterest reports that only 20 percent of its international users are frequent online shoppers ($FOS_{PINS,OUT}$), a dramatic change from what they observe in the US (Pinterest, 2021[8]). We assume that the percentage of new PayPal active accounts remains 20 percent as in the US. PayPal's conversion rate and its ARPU growth rate do not change as they were already worldwide statistics. So, the number of additional PayPal active accounts (new PYPL AAs) outside the US is given by:

$$New\ AAs_{PYPL} = AAs_{PINS,OUT,2022} \times \%\ of\ FOS_{PINS,OUT} \times\ conversion\ rate_{PYPL} \times \%\ of\ new\ AAs_{PYPL}$$

So,

$$FCF_{2022} = New\ AAs_{PYPL} \times ARPU_{PYPL,2021} \times (1 + ARPU_{PYPL}\ growth\ rate)\ \times FCF\ margin$$

And,

$$g_s = (1 + \ ARPU_{PYPL}\ growth\ rate\ ) \times \left(1 + AAs_{PINS,OUT}\ growth\ rate\right)$$

$$g_l = 5\%\ (higher\ than\ world\ GDP\ growth)$$

$$PV_2 = \frac{FCF_{2022}}{1+r} + \frac{FCF_{2023}}{(1+r)^2} + \frac{FCF_{2024}}{(1+r)^3} + \frac{FCF_{2025}}{(1+r)^4} + \frac{FCF_{2026}}{(1+r)^5} + \frac{FCF_{2027}}{(r-g_l)(1+r)^5}$$

3. Increase in Pinterest's ARPU in the US

In this scenario, we suppose that if Pinterest accepts PayPal as a payment method (i.e., checkout button or QR code), then consumers will be willing to spend more, increasing the ARPU of Pinterest. According to PayPal, there is a 54 percent increase in consumers' willingness to buy online when PayPal is available (PayPal, 2021[9]). In addition to that, if Pinterest could provide its users with more financing options, such as discount finders and BNPL options, then consumers will be more engaged, resulting in higher sales. We assume that a merger would increase sales of Pinterest by 54 percent forever given the abovementioned statistics. It is important to differentiate between the US and outside because Pinterest is a more mature company in the US than elsewhere. Pinterest's ARPU growth rate and active accounts growth rate in the US are then lower than in the rest of the world. However, we would expect the growth rates inside and outside the US to converge toward a similar level, which is the US GDP growth rate and the world GDP growth rate, respectively. The growth rates of Pinterest's ARPU and active accounts are calculated by taking an average of analysts' estimates from 2022 to 2026 in the US. Therefore, the extra cash flows generated in 2022 in the US is given by:

$$FCF_{2022} = \left[AAs_{PINS,US,2022} \times ARPU_{PINS,US,2021}\ \times \left(1 + ARPU_{PINS,US}\ growth\ rate\right)\right] \times \%\ increase\ in\ sales \times FCF\ margin$$

and,

$$g_s = \left(1 + \ ARPU_{PINS,US}\ growth\ rate\ \right) \times \left(1 + AAs_{PINS,US}\ growth\ rate\right)$$

$$g_l = 4\%$$

Therefore,

$$PV_3 = \frac{FCF_{2022}}{1+r} + \frac{FCF_{2023}}{(1+r)^2} + \frac{FCF_{2024}}{(1+r)^3} + \frac{FCF_{2025}}{(1+r)^4} + \frac{FCF_{2026}}{(1+r)^5} + \frac{FCF_{2027}}{(r-g_l)(1+r)^5}$$

4. Increase in Pinterest's ARPU outside the US

As previously mentioned, Pinterest has exceptional growth potential outside the US. 80 percent of the company's active accounts live outside the US, but they generate only 20 percent of Pinterest's annual revenue. The San Francisco-based company stated that they are confident that they can keep growing revenue outside the US (Business Wire, 2021[6]). For this reason, we believe Pinterest's ARPU growth rate ($ARPU_{PINS,OUT}\ growth\ rate$) and active accounts growth rate ($AAs_{PINS,OUT}\ growth\ rate$) are estimated to be 27.1% and 5.8%, respectively. Again, these numbers are calculated by taking an average of analysts' estimates from 2022 to 2026 outside the US. The sustainable growth rate here is assumed to be 5%, which is slightly higher than the world GDP growth rate to account for the high potential of the digital payment/e-commerce industry. The extra free cash flows in 2022 and the growth rates in the first and second stage are given by:

$$FCF_{2022} = \left[AAs_{PINS,OUT,2022} \times ARPU_{PINS,OUT,2021} \times \left(1 + ARPU_{PINS,OUT}\ growth\ rate\right)\right] \times \%\ increase\ in\ sales \times FCF\ margin$$

and,

$$g_s = \left(1 + ARPU_{PINS,OUT}\ growth\ rate\right) \times \left(1 + AAs_{PINS,OUT}\ growth\ rate\right)$$

$$g_l = 5\%$$

Therefore,

$$PV_4 = \frac{FCF_{2022}}{1+r} + \frac{FCF_{2023}}{(1+r)^2} + \frac{FCF_{2024}}{(1+r)^3} + \frac{FCF_{2025}}{(1+r)^4} + \frac{FCF_{2026}}{(1+r)^5} + \frac{FCF_{2027}}{(r-g_l)(1+r)^5}$$

Although these extra cash flows generated from the combined firm might not be mutually exclusive, they represent a fair approximation of what practitioners believe creates significant value in this merger transaction. Therefore, the merger gain for the PayPal-Pinterest transaction is given by the following equation:

$$\Delta PV(PYPL + PINS) = \sum_{i=1}^{4} PV_i = PV_1 + PV_2 + PV_3 + PV_4$$

Now, a positive merger gain does not necessarily justify PayPal's acquisition of Pinterest. Instead, it is necessary to consider the price that PayPal agreed to pay for Pinterest, which amounted to $39 billion, according to the Wall Street Journal (2021). Moreover, PayPal disclosed no information on whether the merger transaction would have been financed either through cash or stock. However, this paper assumes that it would have been most likely a stock deal since, as of October 30th, PayPal reported cash and cash equivalents only for $7.78 billion, which was substantially lower than the offered price. Assuming PayPal would have exchanged its shares one-for-one in the combined firm, the amount paid for Pinterest is given by:

$$\begin{aligned} Amount\ paid &= N \times P_{PYPL,PINS} = N \times \frac{PV(PYPL) + PV(PINS) + \Delta PV(PYPL + PINS)}{X + N} \\ &= \$39\ B \end{aligned}$$

where $P_{PYPL,PINS}$ represents the value of shares in the combined firm, X is the number of shares outstanding for PayPal, which amounted to 1.1749 million, and N is the number of shares offered by PayPal in the combined company in exchange for Pinterest's shares. Therefore, to understand whether PayPal should have acquired Pinterest or not, we need to estimate how the merger gain $\Delta PV(PYPL + PINS)$ was split between the two companies. According to Brealey et al. (2020), if the bidder offers a merger premium – defined as the difference between the price offered and the market value of the target company – equal to the value of the merger gain, then the target shareholders (i.e., Pinterest) will enjoy all the benefits and the merger will generate a zero net present value investment for the bidder shareholders (i.e., PayPal). Therefore, the following two conditions must be fulfilled for the merger to be justified:

$$Merger\ premium = \left(N \times P_{PYPL,PINS}\right) - PV(PINS) > 0$$

and,

$$NPV\ of\ merger = \Delta PV(PYPL + PINS) - Merger\ premium > 0$$

where,

$$\Delta PV(PYPL + PINS) = Merger\ premium + NPV\ of\ merger$$

In other words, the merger transaction should be completed if both the bidder and target shareholders can split the value of the synergies. Finally, it is worth noting how the value of these synergies is split between the two parties is subject to negotiation and reflects the willingness to sell/buy of both companies.

5. Results

I. Discount Rate

As discussed in the methodology section, the appropriate discount rate used for the merger transaction is PayPal's cost of equity, which is given by:

$$r_e = r_f + \beta[E(r_m) - r_f]$$

To calculate β, or the systematic risk, this paper regressed PayPal's monthly returns against those of the S&P 500 Index using the Regression command from the Data Analysis menu of Excel. The scatter diagram in Figure 5 shows the data point for each month from October 2016 to October 2021 as well as the regression line that best fits the data.

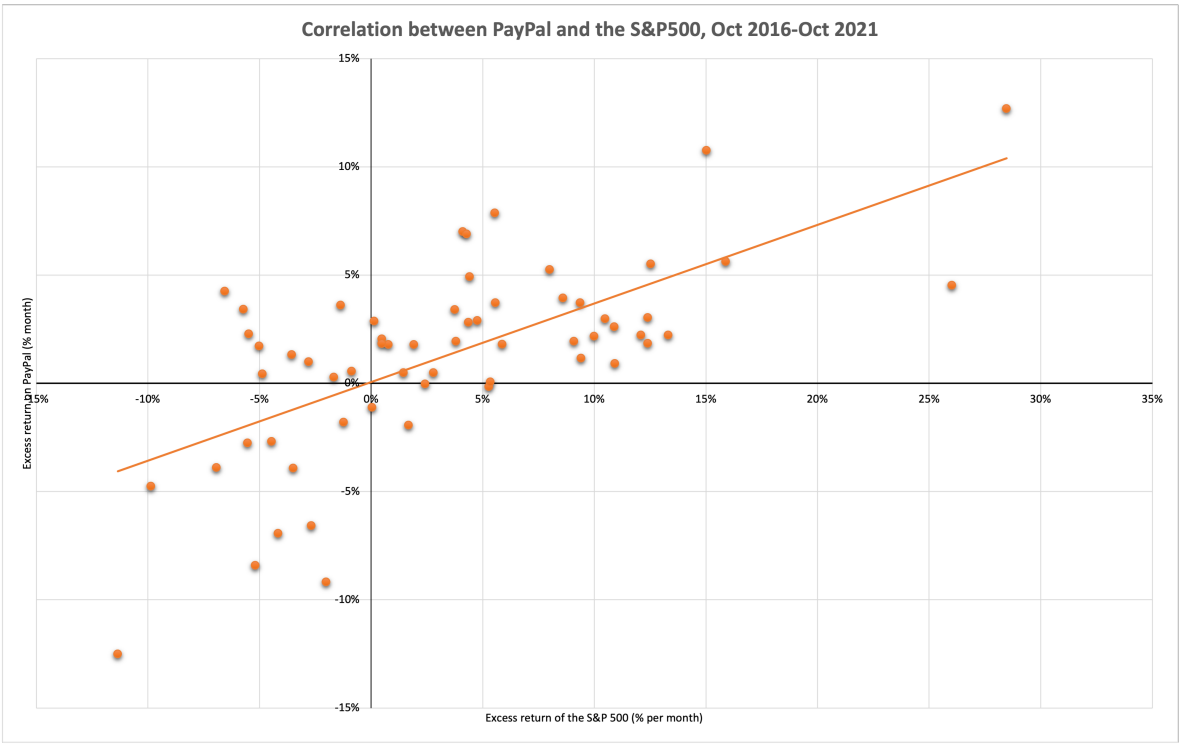

Figure 5: Scatter Diagram for PayPal against the S&P 500 Index, Oct 2016-Oct 2021

Figure 6 illustrates the regression output from Excel. The results from our OLS regression analysis suggest a β, or systematic risk, of 1.1873. The standard error of this estimate is 0.178, resulting in a *t*-statistic of 6.68, and a *p*-value that can be approximated to zero. In other words, the probability of observing such an estimate if the true beta is zero is negligible. In addition to that, it is worth testing whether PayPal's beta is significantly different from the average stock beta of 1. Such hypothesis can be tested by the following equation:

$$t = \frac{Estimated\ value - Hypothesis\ value}{Standard\ error\ of\ estimate} = \frac{1.1873 - 1}{.1777} = 1.05$$

Since the value is considerably below the critical value level of 5% (i.e., 1.96), we can reject the null hypothesis that PayPal's beta is equal to 1. Lastly, the 95% confidence interval for beta ranges from .83 to 1.54.

Thus, the appropriate discount rate for the transaction is estimated to be:

$$r_e = r_f + \beta\left[E(r_m) - r_f\right] = 4\% + 1.1873 \times (10\% - 4\%) = 11.12\%$$

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.65639362
R Square	0.430852585
Adjusted R Square	0.421206018
Standard Error	0.060180676
Observations	61

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.161759604	0.161759604	44.6638284	9.28287E-09
Residual	59	0.213681115	0.003621714		
Total	60	0.375440719			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0.018878185	0.008047198	2.345932589	0.022359642	0.002775778	0.034980591	0.002775778	0.034980591
X Variable 1	1.187264279	0.177651725	6.683100209	9.28287E-09	0.831783999	1.542744559	0.831783999	1.542744559

Figure 6: OLS Regression Output, Oct 2016-Oct 2021

II. Projected Extra Free Cash Flow to the Firm in Two-Stage Growth Model

Once we estimated the appropriate discount rate, we can proceed by projecting out the extra free cash flow generated by the combining firm. This section will illustrate the results for each source of extra cash flows as discussed in the Methodology section. We will then sum the individual results for each source to calculate the merger gain $\Delta PV(PYPL + PINS)$.

1. New PayPal active accounts from Pinterest's user base in the US

Figure 7 shows the additional free cash flow that can be generated by converting a percentage of Pinterest's user base in the US into new PayPal active accounts. It can be noted that during the projection period between 2022 and 2026 the short-term growth rate of the free cash flow is estimated to be 9.83 percent, which represents a combination of PayPal's ARPU growth rate and Pinterest's active accounts growth rate in the US. Both PayPal's ARPU growth rate and Pinterest's

active accounts growth rate are calculated by averaging estimates from 25 different Wall Street analysts publicly available on Bloomberg. The growth rate of the free cash flow to the firm beyond 2026 is assumed to equal the GDP growth rate, as discussed in the Methodology section. Once we projected out the free cash flows to the firm in our two-stage growth periods, we calculated the present value of this source of extra free cash flow to be:

$$PV_1 = \frac{FCF_{2022}}{1+r} + \frac{FCF_{2023}}{(1+r)^2} + \frac{FCF_{2024}}{(1+r)^3} + \frac{FCF_{2025}}{(1+r)^4} + \frac{FCF_{2026}}{(1+r)^5} + \frac{FCF_{2027}}{(r-g_l)(1+r)^5}$$

$$= \frac{\$112.7\ M}{1.1112} + \frac{\$123.7\ M}{1.1112^2} + \frac{\$135.9\ M}{1.1112^3} + \frac{\$149.3\ M}{1.1112^4} + \frac{\$163.9\ M}{1.1112^5}$$

$$+ \frac{\$170.5\ M}{(0.0709) \times (1.1112)^5} = \$1{,}913.852\ M$$

Figure 7 suggests that converting part of Pinterest's active accounts into PayPal's will generate a present value of US$ 1.913 billion.

	2021	2022	2023	2024	2025	2026	2027
Active Accounts	90000000	91922007.99	93885061.7	95890037.69	97937831.23	100029356.7	101029650.3
Growth rate in active accounts		*2%*	*2%*	*2%*	*2%*	*2%*	*1%*
% of frequent Pins shoppers	*50%*	*50%*	*50%*	*50%*	*50%*	*50%*	*50%*
Number of PINS shoppers	45000000	45961004	46942530.85	47945018.85	48968915.62	50014678.36	50514825.15
% of online buyers that use PYPL	*88%*	*88%*	*88%*	*88%*	*88%*	*88%*	*88%*
Number of PINS shoppers that use PYPL	39375000	40215878.5	41074714.5	41951891.49	42847801.16	43762843.57	44200472
% of new PYPL account from PINS	*0%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*
Number of new PYPL accounts from PINS	0	8043175.699	8214942.899	8390378.298	8569560.233	8752568.714	8840094.401
ARPU of PYPL	$ 59.20	$ 63.66	$ 68.46	$ 73.62	$ 79.16	$ 85.13	$ 87.68
Growth rate in ARPU of PYPL		*8%*	*8%*	*8%*	*8%*	*8%*	*3%*
Additional Revenue	$ -	$ 512,061,952.39	$ 562,396,933.63	$ 617,679,773.86	$ 678,396,840.77	$ 745,082,311.33	$ 775,109,128.48
Free Cash Flow Margin	*22%*	*22%*	*22%*	*22%*	*22%*	*22%*	*22%*
Free Cash Flow	**$ -**	**$ 112,653,629.53**	**$ 123,727,325.40**	**$ 135,889,550.25**	**$ 149,247,304.97**	**$ 163,918,108.49**	**$ 170,524,008.26**
Discount	1	1.111238	1.234849893	1.372212125	1.524854257	1.694475995	
PV	$ -	$ 101,376,689.36	$ 100,196,247.44	$ 99,029,550.73	$ 97,876,439.17	$ 96,736,754.58	
PV of Free Cash Flows	$ 495,215,681.29						
Horizon Value						$ 2,403,845,728.17	
PV of Horizon Value	$ 1,418,636,637.47						
Project Value	**$ 1,913,852,318.76**						

Figure 7: Discounted Cash Flow Analysis for new PayPal active accounts in the US

2. New PayPal active accounts from Pinterest's user base outside the US

Figure 8 shows the extra cash flows that can be generated by converting some of Pinterest's active accounts outside the US into new PayPal active users. We estimated the short-term and long-term growth rates to be 13.7 percent and 5 percent, respectively. These estimates align with PayPal's strategy to significantly expand its international footprint, which currently represents a minor

source of revenue for the company. Therefore, a merger with Pinterest can create substantial value to PayPal because it would have quick access to an international user base and increase its international penetration rate. Thus, we estimated the present value of this source of extra cash flow to be:

$$PV_2 = \frac{FCF_{2022}}{1+r} + \frac{FCF_{2023}}{(1+r)^2} + \frac{FCF_{2024}}{(1+r)^3} + \frac{FCF_{2025}}{(1+r)^4} + \frac{FCF_{2026}}{(1+r)^5} + \frac{FCF_{2027}}{(r-g_l)(1+r)^5}$$

$$= \frac{\$187.2\ M}{1.1112} + \frac{\$212.9\ M}{1.1112^2} + \frac{\$242.1\ M}{1.1112^3} + \frac{\$275.3\ M}{1.1112^4} + \frac{\$313.1\ M}{1.1112^5}$$

$$+ \frac{\$328.9\ M}{0.0601 \times (1.1112^5)} = \$4{,}083.930\ M$$

	2021	2022	2023	2024	2025	2026	2027
Active Accounts	361000000	381795102.7	403788089.8	427047964.6	451647705	477664492.8	487217782.7
Growth rate in active accounts		*6%*	*6%*	*6%*	*6%*	*6%*	*2%*
% of frequent Pins shoppers	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*
Number of PINS shoppers	72200000	76359020.54	80757617.97	85409592.92	90329541	95532898.56	97443556.53
% of online buyers that use PYPL	*88%*	*88%*	*88%*	*88%*	*88%*	*88%*	*88%*
Number of PINS shoppers that use PYPL	63175000	66814142.97	70662915.72	74733393.81	79038348.37	83591286.24	85263111.96
% of new PYPL account from PINS	*0%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*
Number of new PYPL accounts from PINS	0	13362828.59	14132583.14	14946678.76	15807669.67	16718257.25	17052622.39
ARPU of PYPL	$ 59.20	$ 63.66	$ 68.46	$ 73.62	$ 79.16	$ 85.13	$ 87.68
Growth rate in ARPU of PYPL		*8%*	*8%*	*8%*	*8%*	*8%*	*3%*
Additional Revenue	$ -	$ 850,733,137.65	$ 967,519,984.30	$ 1,100,339,082.38	$ 1,251,391,305.45	$ 1,423,179,658.38	$ 1,495,192,549.09
Free Cash Flow Margin	22%	22%	22%	22%	22%	22%	22%
Free Cash Flow	**$ -**	**$ 187,161,290.28**	**$ 212,854,396.55**	**$ 242,074,598.12**	**$ 275,306,087.20**	**$ 313,099,524.84**	**$ 328,942,360.80**
Discount	1	1.111238	1.234849893	1.372212125	1.524854257	1.694475995	
PV	$ -	$ 168,425,927.01	$ 172,372,689.03	$ 176,411,936.40	$ 180,545,836.34	$ 184,776,606.88	
PV of Free Cash Flows	$ 882,532,995.67						
Horizon Value						$ 5,424,690,141.50	
PV of Horizon Value	$ 3,201,396,866.48						
Project Value	**$ 4,083,929,862.16**						

Figure 8: Discounted Cash Flow Analysis for new PayPal active accounts outside the US

3. Increase in Pinterest's ARPU in the US

Figure 9 considers the scenario in which Pinterest provides its user base with PayPal's payment methods, including the checkout button, discount finders, and BNPL services. The underlying assumption is that if more payment options are offered to Pinterest's user base, then customers are more willing to engage with the app, resulting in higher sales. It can be observed that during the projection period between 2022 and 2026 the short-term growth rate of the free cash flow is estimated to be 9.4 percent, which represents a combination of Pinterest's ARPU growth rate and active accounts growth rate in the US. Both growth rates are calculated by averaging estimates from 25 different Wall Street analysts publicly available on Bloomberg. It is important to

differentiate between the US and outside because Pinterest is a more mature company in the US than elsewhere. Pinterest's ARPU growth rate and active accounts growth rate in the US are then lower than in the rest of the world. However, we would expect the growth rates inside and outside the US to converge toward a similar level, which is the US GDP growth rate and the world GDP growth rate, respectively. Once we projected out the free cash flows to the firm in our two-stage growth periods, we calculated the present value of this source of extra free cash flow to be:

$$PV_3 = \frac{FCF_{2022}}{1+r} + \frac{FCF_{2023}}{(1+r)^2} + \frac{FCF_{2024}}{(1+r)^3} + \frac{FCF_{2025}}{(1+r)^4} + \frac{FCF_{2026}}{(1+r)^5} + \frac{FCF_{2027}}{(r-g_l)(1+r)^5}$$

$$= \frac{\$93.2\ M}{1.1112} + \frac{\$102.0\ M}{1.1112^2} + \frac{\$111.6\ M}{1.1112^3} + \frac{\$122.1\ M}{1.1112^4} + \frac{\$133.6\ M}{1.1112^5}$$

$$+ \frac{\$139.0\ M}{0.071 \times (1.1112)^5} = \$1{,}562.815\ M$$

	2021	2022	2023	2024	2025	2026	2027
ARPU before PYPL	$ 21.50	$ 23.04	$ 24.68	$ 26.44	$ 28.33	$ 30.35	$ 31.26
Growth rate in ARPU_US		*7%*	*7%*	*7%*	*7%*	*7%*	*3%*
Active Accounts	90000000	91922007.99	93885061.7	95890037.69	97937831.23	100029356.7	101029650.3
Growth rate in active accounts		*2%*	*2%*	*2%*	*2%*	*2%*	*1%*
Revenue before PYPL	$ 1,935,000,000	$ 2,117,445,696	$ 2,317,093,683	$ 2,535,565,915	$ 2,774,637,279	$ 3,036,250,008	$ 3,158,610,883
% increase in sales from PYPL	*0%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*
Revenue after PYPL	$ 1,935,000,000	$ 2,540,934,835	$ 2,780,512,419	$ 3,042,679,099	$ 3,329,564,735	$ 3,643,500,009	$ 3,790,333,060
Additional revenue	$ -	$ 423,489,139	$ 463,418,737	$ 507,113,183	$ 554,927,456	$ 607,250,002	$ 631,722,177
Free Cash Flow Margin	22%	22%	22%	22%	22%	22%	22%
Free Cash Flow	**$ -**	**$ 93,167,611**	**$ 101,952,122**	**$ 111,564,900**	**$ 122,084,040**	**$ 133,595,000**	**$ 138,978,879**
Discount	1	1.111238	1.234849893	1.372212125	1.524854257	1.694475995	
PV	$ -	$ 83,841,275	$ 82,562,361	$ 81,302,955	$ 80,062,760	$ 78,841,483	
PV of Free Cash Flows	$ 406,610,833						
Horizon Value						$ 1,959,159,813.66	
PV of Horizon Value	$ 1,156,203,935.11						
Project Value	**$ 1,562,814,768.16**						

Figure 9: Discounted Cash Flow Analysis for the increase in Pinterest's ARPU in the US

4. Increase in Pinterest's ARPU outside the US

Lastly, Figure 10 describes the scenario in which Pinterest accepts PayPal's payment methods outside the US. It can be noted that during the projection period between 2022 and 2026 the free cash flows are expected to grow by an annual average of 34 percent. This estimate is not surprising because PayPal has still significant room to expand internationally. In the long-term, on the other hand, the free cash flows are assumed to grow at 5 percent, which equals the long-term world GDP growth rate. Thus, we estimated the present value of this source of extra cash flow to be:

$$PV_4 = \frac{FCF_{2022}}{1+r} + \frac{FCF_{2023}}{(1+r)^2} + \frac{FCF_{2024}}{(1+r)^3} + \frac{FCF_{2025}}{(1+r)^4} + \frac{FCF_{2026}}{(1+r)^5} + \frac{FCF_{2027}}{(r-g_l)(1+r)^5}$$

$$= \frac{\$30.4\,M}{1.1112} + \frac{\$40.8\,M}{1.1112^2} + \frac{\$54.9\,M}{1.1112^3} + \frac{\$73.8\,M}{1.1112^4} + \frac{\$99.1\,M}{1.1112^5} + \frac{\$104.1\,M}{0.060 \times (1.1112)^5}$$

$$= \$3{,}832.800$$

	2021	2022	2023	2024	2025	2026	2027
ARPU before PYPL	$ 1.42	$ 1.81	$ 2.30	$ 2.92	$ 3.71	$ 4.72	$ 4.86
growth rate in ARPU_OUT		*27%*	*27%*	*27%*	*27%*	*27%*	*3%*
Active Accounts	361000000	381795102.7	403788089.8	427047964.6	451647705	477664492.8	487217782.7
Growth rate in active accounts		*6%*	*6%*	*6%*	*6%*	*6%*	*2%*
Revenue before PYPL	$ 513,560,000.00	$ 690,264,186.35	$ 927,768,219.81	$ 1,246,991,929.61	$ 1,676,053,177.20	$ 2,252,744,533.54	$ 2,366,733,406.94
% increase in sales from PYPL	*0%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*
Revenue after PYPL	$ 513,560,000.00	$ 828,317,023.63	$ 1,113,321,863.77	$ 1,496,390,315.53	$ 2,011,263,812.64	$ 2,703,293,440.25	$ 2,840,080,088.33
Additional revenue	$ -	$ 138,052,837.27	$ 185,553,643.96	$ 249,398,385.92	$ 335,210,635.44	$ 450,548,906.71	$ 473,346,681.39
Free Cash Flow Margin	22%	22%	22%	22%	22%	22%	22%
Free Cash Flow	**$ -**	**$ 30,371,624.20**	**$ 40,821,801.67**	**$ 54,867,644.90**	**$ 73,746,339.80**	**$ 99,120,759.48**	**$ 104,136,269.91**
Discount	1	1.111238	1.234849893	1.372212125	1.524854257	1.694475995	
PV	$ -	$ 27,331,340.54	$ 33,058,108.45	$ 39,984,812.77	$ 48,362,877.59	$ 58,496,408.18	
PV of Free Cash Flows	$ 207,233,547.54						
Horizon Value						$ 6,143,436,075.98	
PV of Horizon Value	$ 3,625,566,896.92						
Project Value	**$ 3,832,800,444.46**						

Figure 10: Discounted Cash Flow Analysis for the increase in Pinterest's ARPU outside the US

II. Stock Deal

Now that we have all the present value for the extra cash flow, we can add them together to get to the merger gain:

$$\Delta PV(PYPL + PINS) = PV_1 + PV_2 + PV_3 + PV_4 = \$1.91B + \$4.08B + \$1.56B + \$3.83$$
$$= \$11.39B$$

So,

$$PV(PYPL + PINS) = PV(PYPL) + PV(PINS) + \Delta PV(PYPL + PINS)$$
$$= 319.22 + 31.28 + 11.39 = \$361.88B$$

No information was disclosed of whether PayPal would have financed the acquisition by cash, stock, or a combination of cash and stock. But it would have most likely been a stock deal because, as of October 30th, PayPal only had $7.78 billion in cash and cash equivalents, which was

substantially lower than the $39 billion proposed price. We will now estimate the number of shares N in the combined company that should have been offered to buy Pinterest. We assume that PayPal exchanges its shares for one-for-one in the combined firm. So,

$$(Eq.1)\ Amount\ paid\ for\ PINS = \$39B = N \times P_{PYPL,PINS}$$

$$P_{PYPL,PINS} = \frac{PV(PYPL) + PV(PINS) + \Delta PV(PYPL + PINS)}{X_{PYPL} + N} = \frac{\$361.88}{1.1749 + N}$$

So, by plugging this value into equation 1, we get

$$39 = N \times \frac{361.88}{1.1749 + N}$$

$$39 \times 1.1749 + 39N = 361.90N$$

$$N = \frac{39 \times 1.1749}{361.90 - 39} = \frac{45.821B}{322.90B} = 141.91\ million\ shares$$

PayPal would have then offered 141.9 million shares for buying Pinterest. Then, the value of a share in the combined firm, as well as the merger premium, would have been:

$$P_{PYPL,PINS} = \frac{\$361.88}{1.1749 + N} = \frac{\$361.88}{1.1749 + 0.1419} = \$274.82$$

$$Merger\ premium = price\ offered\ for\ PINS - PV(PINS) = \$39 - \$31.28 = \$7.73B$$

Pinterest would have most likely accepted the offer because $39 billion implied a merger premium of 24.7% (i.e., merger premium divided by Pinterest's market capitalization on October 19th), which was substantially higher than the 11.7% merger premium offered by Microsoft on February 11th (Financial Times, 2021[10]). PayPal's shareholders, on the other hand, would have gotten a positive NPV given by:

$$NPV\ of\ merger = \left(X_{PYPL} \times P_{PYPL,PINS}\right) - PV(PYPL) = (1.1749B \times \$274.83) - \$319.22B$$
$$= \$322.90B - \$319.22B = \$3.67B > 0$$

Merger Summary			
As of 10/19/21			
	PYPL stock price	$	271.70
	PYPL shares outstanding		1174900000
	PV(PYPL)	$	319,220,330,000.00
	PINS stock price	$	55.58
	PINS shares outstanding		562700000
	PV(PINS)	$	31,274,866,000.00
	delta_PV(PYPL+PINS)	**$**	**11,393,397,393.53**
	Amount paid for PINS	$	39,000,000,000.00
	Merger premium	**$**	**7,725,134,000.00**
	% Merger premium		***24.70%***
	PV(PYPL+PINS)	$	361,888,593,393.53
	Number of shares offered		141909937.2
	New Price of PYPL	**$**	**274.82**
	NPV of merger	**$**	**3,668,263,393.53**
	Should PYPL acquire PINS' YES		

Figure 11: Summary of merger analysis between PayPal and Pinterest

Microsoft Deal			
As of 02/11/21			
	PINS stock price	$	81.12
	PINS shares outstanding		562700000
	PV(PINS)	$	45,646,224,000.00
	Amount paid for PINS	$	51,000,000,000.00
	Merger premium	**$**	**5,353,776,000.00**
	% Merger premium		***11.73%***

Figure 12: Summary of merger analysis between Microsoft and Pinterest

6. Conclusion and discussion

It can be noted that Pinterest's shareholders would have earned more than double the amount that PayPal's shareholders would have gained from this deal. However, there are two reasons why PayPal's shareholders should have still pursued this option. Firstly, PayPal needs to increase its user base as quickly as possible to face increasing competition from other social media platforms. Meta, for example, is entering the digital payment market and it will leverage network effects to ensure the success of its payment platform. Lastly, Pinterest is currently trading at low price levels, despite its steady engagement with users as well as willingness to constantly launch new innovative products. Pinterest will become a more attractive stock in the future as advertisers seek to reduce their dependence on large platforms like Meta and Google. Therefore, PayPal's shareholders missed out on a good opportunity to create value.

A. Intellectual Merits

This research addresses many of the questions that academics and practitioners raised when PayPal called off the acquisition of Pinterest. Particularly, this research clarifies whether PayPal's shareholders missed an opportunity to create lasting value for the company. The research also explores for the first time in the corporate finance literature the possibility of combining a fintech giant with a social media platform. Such conglomerate mergers between two firms that are involved in unrelated business activities will become more popular in a business environment where big tech firms, such as Meta, WeChat, Google, increase the number of services provided on their platforms. Therefore, this research makes a significant contribution to the corporate finance literature for it offers novel ideas on how to evaluate different synergies in the fintech and social media sectors. In addition to that, this paper incorporates Wall Street analysts' estimates about future revenue and earnings performances. Academics will find these data very useful as they provide valuable information about market confidence as well as industry projections. Future research will benefit from this paper as it makes extensive use of established finance theories, such as the CAPM, a merger analysis, and a discounted cash flow analysis, to make informed

predictions about the intrinsic (fundamental) value of the combined firm. However, this research is not without its limitations. Even though the methodology used for the acquisition analysis is rigorous and consistent with the corporate finance literature, the sources of additional cash flows in the combined firm proposed by this paper are purely hypothetical due to the nature of this case study and should be taken *cum grano salis*. The research results attempt to present a portrait of the combined firm that can be used by interested parties to assess the feasibility of the merger transaction.

B. Practical Impacts

This research can benefit primarily three parties: PayPal's shareholders, investment banks, and fintech professionals. The withdrawal of the merger proposal between PayPal and Pinterest has attracted particular attention from media and investors. First, PayPal's shareholders will find this research particularly useful as it provides a more structured analysis of the merger based on established corporate finance theories. Although this research has its own limitations as discussed in the Intellectual Merits section, it suggests that PayPal's shareholders have missed a good opportunity to create value. Second, investment banks can benefit from this research analysis as it estimates the merger gain as well as the effect on PayPal's stock price using a discounted cash flow analysis. Most investment banks rely on financial modeling techniques to advise companies about strategic opportunities. This research can then serve as support evidence in further merger discussions between PayPal and Pinterest. Lastly, fintech professionals can gain additional insights into how fintech giants are determined to become much more than just payments companies due to rising competition from big tech firms. PayPal, for example, aims at turning into a service platform where its users can engage with each other and have access to multiple services.

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Part II: Supplementary Resources

Part III: Related Products

i. Experiential Learning Activities

Describe the proposed activities that will be done during the Experiential Learning activity/activities. Indicate clearly the rationale/purpose of the activity or activities and how it/they integrate into the overall Signature Work project. For instance, how are they related to the three thematic courses and/or SW project? What parts of the activity are most important to you? Maximum 1200 words.

There are three activities that I will use to fulfill my Experiential Learning requirement:

1. My summer internship between my freshman and sophomore year where I worked as an M&A analyst intern in an investment management firm headquartered in Shanghai. This experience is relevant for my Signature Work primarily for one reason. It gave me the tools necessary to perform a merger analysis. My Signature Work explores the question of whether fintech giant PayPal should have acquired social media Pinterest. It can be noted that to perform a comprehensive analysis, a deep understanding of different valuation techniques and real-life applications represents an important component of this project.

2. My summer internship between my sophomore and junior year where I worked as a research analyst intern and covered FinTech at the Italian Banking Association. This experience not only provided me with a solid technical foundation in several financial technologies but also sparked my interest in different fintech business models. As a result of this experience, I have started learning more about new applications of financial technologies and was fascinated by the possibility of a fintech company serving also as a big social media network. As soon as I heard about the news of a potential merger between PayPal and Pinterest, I thought that I could capitalize on this unique opportunity and eventually conduct in-depth analysis about it. This is how I chose my Signature Work's research question. If it wasn't for this internship experience, I would have never been able to have such a deep exposure to multiple fintech companies as well as access to different mentors and professionals in the fintech industry that I can always reach out to.

3. My summer internship between my junior and senior year where I worked as a corporate finance analyst intern in a multinational manufacturing company in northern Italy. This is probably the one experience where I really had the opportunity to hone my knowledge of financial modeling and project valuation. During this extremely rewarding 3-month summer internship, I have put into practice what I have studied in two of my thematic courses, namely ECON 372 Asset Pricing and Risk Management and ECON 373 Corporate Finance. Here, I was working closely with the company's CEO and CFO to design a model that could inform management whether to undertake a project or not. Having a hands-on experience enabled me to consider different business concepts that were not largely discussed in my classes. In addition to that, this experience had a positive effect on the overall quality of my Signature Work. The computer skills, including data

visualization and Microsoft Office, that I developed throughout my internship were crucial in drawing informed conclusions from my data. You will see that my Signature Work project will involve a lot of Excel modeling that I could have not been able to perform if it was not for my job in Formenti & Giovenzana.

You should consider all aspects of the experience, both positive and negative, and relate them to your SW project's overall goal. please describe how the experiences unfolded, what were the major highlights and what challenges you faced and how they were overcome. The word count should be around 2000 - 3000 words.

In this report, I will describe in more depth the following three activities:

1. My summer internship between my freshman and sophomore year where I worked as an M&A analyst intern in an investment management firm headquartered in Shanghai. This experience is relevant for my Signature Work primarily for one reason. It gave me the tools necessary to perform a merger analysis. My Signature Work explores the question of whether fintech giant PayPal should have acquired social media Pinterest. It can be noted that to perform a comprehensive analysis, a deep understanding of different valuation techniques and real-life applications represents an important component of this project.

2. My summer internship between my sophomore and junior year where I worked as a research analyst intern and covered FinTech at the Italian Banking Association. This experience not only provided me with a solid technical foundation in several financial technologies but also sparked my interest in different fintech business models. As a result of this experience, I have started learning more about new applications of financial technologies and was fascinated by the possibility of a fintech company serving also as a big social media network. As soon as I heard about the news of a potential merger between PayPal and Pinterest, I thought that I could capitalize on this unique opportunity and eventually conduct in-depth analysis about it. This is how I chose my Signature Work's research question. If it wasn't for this internship experience, I would have never been able to have such a deep exposure to multiple fintech companies as well as access to different mentors and professionals in the fintech industry that I can always reach out to.

3. My summer internship between my junior and senior year where I worked as a corporate finance analyst intern in a multinational manufacturing company in northern Italy. This is probably the one experience where I really had the opportunity to hone my knowledge of financial modeling and project valuation. During this extremely rewarding 3-month summer internship, I have put into practice what I have studied in two of my thematic courses, namely ECON 372 Asset Pricing and Risk Management and ECON 373 Corporate Finance. Here, I was working closely with the company's CEO and CFO to design a model that could inform management whether to undertake a project or not. Having a hands-on experience enabled me to consider different business concepts that were not largely discussed in my classes. In addition to that, this experience had a positive effect on the overall quality of my Signature Work. The computer skills, including data visualization and Microsoft Office, that I developed throughout my internship were crucial in drawing informed conclusions from my data. You will see that my Signature Work project will involve a lot of Excel modeling that I could have not been able to perform if it was not for my job in Formenti & Giovenzana.

I will now give a brief introduction about my biggest achievements in the three internships that I have described before.

1. In my internship as an M&A analyst at Jesa Investment & Management, I was able to:

   a) Produce 10 pitchbooks and 20 teasers for a live buy-side advisory transaction on a $100 million acquisition of a Chinese agrochemical company.
   b) Perform in-depth market and company research focusing on aerospace, robotics, and biomedical sectors.
   c) Analyze a list of 50 potential buy-side and sell-side M&A targets and then assess best deals based on the product line, market share, conversion funnel, and financial wherewithal.
   d) Build a regression model to forecast the effects of the US-China trade war on M&A activity in the Chinese market.

2. In my internship as a FinTech research analyst at the Italian Banking Association, I was able to:

a) Pitch 10 digital solutions (including cloud computing services, natural language processing software, explainable AI algorithms, and data lineage tools) to a syndicate of major Italian banks and financial institutions.
b) Produce 15 cost-benefit analyses for Artificial Intelligence (AI), cloud computing, and blockchain/DLT applications to improve middle office activities, including risk management and data management strategies.
c) Co-author the White Paper "AI and Big Data in the Financial Sector" to inform the European Commission on the current state of advancement of several financial technologies.

3. In my internship as a corporate finance analyst at Formenti & Giovenzana, I was able to:

a) Build a discounted cash flow (DCF) model to estimate the net present value (NPV) of a multi-million furniture supply.
b) Design a sensitivity analysis model based on 6 variables, including volume, BoM cost, unit price, labor cost, Capex, and cycle time, for 25 products manufactured across 7 production plants worldwide.
c) Assist the company's Chief Executive Officer (CEO) and Chief Financial Officer (CFO) in the negotiation of future contracts to hedge against rising aluminum prices.

Now that I have briefly introduced my biggest achievements in my three experiential learning activities, I would like to give some more context about them. More specifically, the next section will try to explain what I learned from these three internships and how they relate to my Signature Work. Please note that I will follow the same chronological order as above.

1. By the time I joined Jesa Investment & Management in May 2019, I was already very familiar with their team and could not wait to go back. I had the pleasure to work with Jesa Investment & Management in their Shanghai headquarter from January 2018 to February 2018 when I did an exchange year at the Shanghai High School Affiliated to JiaoTong University. At that time, I was not covering M&A deals, but instead, I was responsible only for one task. I had to take a pile of business cards and enter the contact information inside the company's proprietary database. The job was very administrative, but I enjoyed every single moment of this experience. From those

infinite number of business cards that I filed, I wasn't just developing invaluable Excel skills, but I was understanding how crucial building an extensive network of professionals was for an M&A advisory firm like Jesa. After one month of business cards after business cards, I had to go back to school, but I knew it was not a goodbye. I loved the firm's culture. Jesa Investment & Management was an extremely diverse company made of professionals coming from different cultural backgrounds and with a strong work ethic. I knew my learning curve there could have been still very steep. So, when they offered me to join their team in May 2019 (freshman summer) and work as an M&A analyst intern, I could not be more excited. As soon as I entered the office, they assigned me to a mentor that provided me with basic financial training that was necessary for the role. The training was important for me because it filled a gap that I had. DKU at that time did not offer any finance-related classes and my knowledge of financial accounting was limited to the movie "The Accountant" with Ben Affleck. I still remember when the Managing Director asked me in my first week of the internship what was the EBITDA of a company we were evaluating. I looked at him as he was speaking some sort of alien language and thought for a second that he would have fired me instantly. Fortunately for me, he not only did not fire me, but saw in me some potential due to my curiosity and willingness to learn. He took me under his wing, and I was lucky enough to be exposed to so many different M&A deals. He would take me to every client meeting he was attending. On my fourth week of internship, I was already working on 5 different M&A transactions at the same time and finished my first pitchbook. I loved my job there and I loved working with people that saw me growing as a man and professional. After my fourth week of internship, the workload started to increase, and my responsibilities also grew. In the following month, I was working very hard but never felt like I was tired. This was the time when I was becoming more comfortable with financial modeling and company valuation techniques. My job responsibilities ranged from financial statements analysis, financial modeling, to running regressions on macroeconomic trends. My Signature Work also required deep analysis of PayPal and Pinterest's financial statements to make predictions about future performance. Therefore, this experience equipped me with the right set of tools required to perform a merger analysis in my Signature Work project at DKU.

2. I really enjoyed learning more about M&A in my freshman summer, but I also wanted to gain some sort of expertise within one specific field. So, in my sophomore summer, I decided to

intern at the Italian Banking Association's FinTech division. This was a prestigious institution in Italy that would have allowed me to conduct research on financial technologies. We were basically acting as intermediaries between software companies, like Amazon, IBM, Microsoft, and Oracle, and major Italian banks and financial institutions. When I joined the team in May 2020, there was a rising demand from banks to digitize customer services and internal processes due to the spreading pandemic. In fact, every single bank in Italy realized that there was a lot of room for growth if their businesses could have solved people's problems. Our clients were either trying to partner with software companies or acquire their technologies. So, my job was to assist our clients and identify the best possible fintech solutions on the market for their specific needs. During my internship here, I had the opportunity to deep dive into different fintech business models as well as their underlying technologies. I enjoyed working for this institution because my work involved so many activities, including meeting with C-suite professionals, attending industry conferences, interviewing professors, and collaborating with special task forces in the European Commission. I think this experience benefited my Signature Work in that it consolidated my passion for FinTech. I realized how fintech services can change our daily lives in ways that are often taken for granted. For example, exchanging money with peers using Venmo or WeChat has made our society less reliant on cash, resulting in increased fiscal transparency and efficiency. In addition to that, I felt like I was having a direct impact on my community in a time when people needed digital services more than ever. Although I was not volunteering in hospitals to fight against the Covid-19 emergency, I was giving my contribution to the cause by accelerating the adoption of different digital services in the financial services industry. Therefore, when I chose my research question for my Signature Work, I knew that it had to reflect my passion for FinTech.

During the past summer, I received an interesting offer to help a multinational manufacturing company transition from a family-run business to a management-run corporate. I was hired to establish a more rigorous, less family-dependent decision framework that could help management evaluate whether to undertake a new project or not. I designed a new model that could help analyze the profitability of the project. More specifically, I integrated the possibility to collect real-time data about the product cost from the industrial accounting department, the selling price from the sales department, and investment cost from the product management department to derive the net present value of the project. I have already discussed in the first section how my Signature Work

project generally benefited from this experience with Formenti & Giovenzana. However, there is another aspect that I would like to stress here. This is the first time in my life where I felt people's jobs and lives depended on me. The manufacturing company had many workers that were hired whenever a new project was undertaken. If the company thought that the project was no longer profitable, then it could have decided either to relocate some workers to other product lines or to lay off some of its staff. My model in a way contributed to management's ultimate decision to scale up or down. Therefore, since the first day of my internship, I knew that I could not afford to make some technical errors in my model because the jobs and the lives of many workers were at stake. This positive pressure served as an incentive to constantly pay attention to details. I tried to approach my Signature Work with the exact same mindset, knowing that my project can have an impact on other people.

ii. SciEcon AMA Article

On February 18th, 2021, I published on article on the SciEcon AMA platform. Please click here to see to full text.

Are Central Bank Digital Currencies (CBDCs) the Future of Money?

On October 1st, 2021, SciEcon AMA member Francesco Cavallero interviewed Ph.D. candidate Luciano Somoza at the Swiss Finance Institute and at HEC Lausanne — University of Lausanne.

About Luciano Somoza

Luciano Somoza is a Ph.D. candidate in economics with a specialization in finance at the Swiss Finance Institute and at HEC Lausanne — University of Lausanne. He is also an adjunct teacher at the University of Luxembourg. His research interests include banking, financial regulation, and fintech. His works have been featured in the Financial Times, Il Sole 24 Ore, LSE Business Review, and Oxford Business Law Blog. He received an M.Sc. in finance from the University of Rochester in 2016 and a B.A. in economics and finance from Bocconi University in 2014.

Read the Interview Script with annotation and graphs:

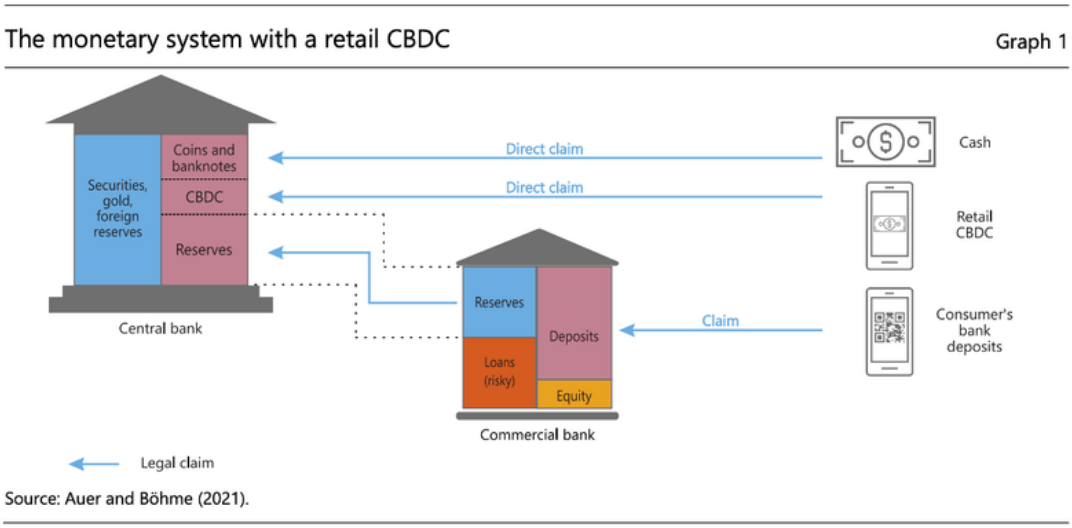

Figure 2: Introduction to retail CBDC vs other payment methods. Source: BIS

Question 1

Francesco: *What is the biggest change Central Bank Digital Currencies (CBDCs) can bring to the financial system as well as the global economy?*

Luciano: Unlike what people may mistakenly think, CBDCs are not only about technology. Yes, they have the potential to speed up payment systems, cut transaction costs, and improve financial inclusion, but it's more than meets the eye. CBDCs are designed to bring a **radical change in how money works**. Today, you can either pay by cash or by credit card. Cash is essentially a liability of a country's central bank, which acts as guarantor of a transaction between two parties. On the other hand, whenever individuals pay with credit cards, they are transacting bank credits, which are denominated in a domestic or international currency, such as the dollar. However, bank credits are not dollars because if a bank goes bankruptcy, bank credits are worth nothing to its depositors. Similarly, banks normally have an account at a country's central bank, where they settle transactions with other banks at the end of each day. This is how our global payment system works today. The future of payments will likely be different from what we have been used to in the past. Governments and central banks around the world are thinking to **allow everybody to open a deposit account at the central bank**. In other words, if you go to Walmart and pay for your groceries, you are exchanging a central bank's liability, not a bank's. This may have marginal implications for the end customer, other than being a slightly cheaper, faster means of payment,

but it has great implications for everything that happens behind the curtains. For example, if a bank's depositor wants to transfer her money to a newly opened bank account at the central bank, it is worth understanding how the transfer will take place between the two banks. It raises important questions like:

- Should the central bank compensate commercial banks for the loss of deposits?
- Should we be worried about disintermediation?
- Who is going to distribute the digital currency?
- Is the central bank collecting transaction data? (today central banks do not have access to granular payment data)
- Who's collecting transaction data that are currently not available to central banks on a granular level?

In terms of how CBDCs will be designed, there is a fundamental choice to make: a token-based or an account-based CBDC. With a token-based CBDC, a payment's receiver verifies the authenticity of the token, just like with physical banknotes. An account-based CBDC would resemble a normal bank deposit. Either way, central banks will likely set in the beginning a maximum limit on the amount of digital currency in your e-wallet, thus restricting its use to small transactions.

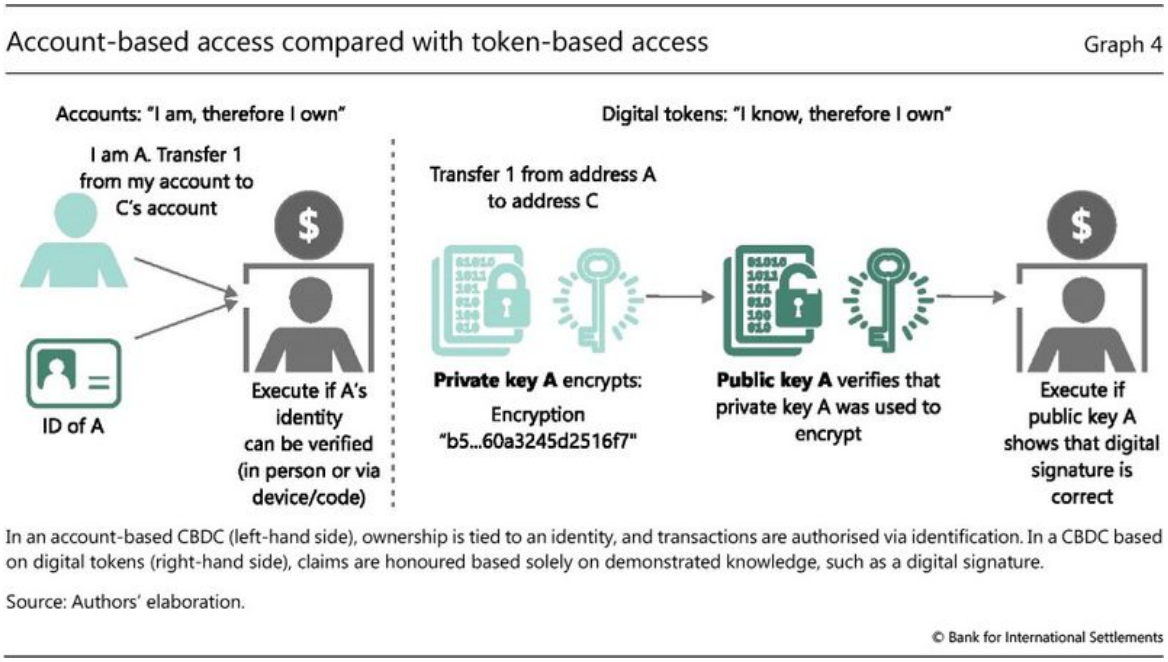

Figure 3: Account-based vs Token-based CBDC. Source: BIS

Question 2

Francesco: *An external observer may feel overwhelmed by the number of emerging technologies that are redefining the global financial system. So, what do you envision to be the future of money?*

Luciano: Politics will be exceptionally crucial in determining what the future of money in 2030 might look like. My best guess is that CBDCs will likely establish themselves as the **most widely used means of payment in the next 15 to 20 years**. Whether CBDCs will be token-based or account-based is still to be determined, but it would not be surprising to see a **hybrid CBDC design** being implemented. Governments must also address questions about the distribution channels of their own CBDC. Will CBDCs be distributed directly by central banks, crowding out commercial bank deposits? Or, will central banks pass the funds through the commercial banks, which will act as intermediaries of the CBDC? Although central banks around the world are currently exploring both options, CBDCs are most likely to be distributed by commercial banks, leaving the environment for banks unchanged.

Traditional private cryptocurrencies, such as Bitcoin, are not money since they are not used for payments. Instead, individuals tend to use Bitcoin for speculative, hedging, and diversification purposes. Evidence from a financial firm's proprietary data shows that there exists a strong substitution effect between some speculative assets and bitcoin. In some developing countries with high inflation rates, however, private cryptocurrencies can represent an attractive alternative to fiat money or cards.

Stablecoins, on the other hand, might play an important role but there is a risk associated with government intervention. This was the case, for example, in China where the government has imposed a 100 percent reserve requirement to Alipay, meaning that every time a customer converts some Chinese yuan in Alipay money, the firm must deposit the same amount in the central bank. In other words, Alipay is a synthetic CBDC because it is 100 percent backed by the central bank. You just have an intermediary in the middle who is taking care of the payment technology. This was done out of political considerations. One might agree or disagree, but whenever you have powerful intermediaries in an economy, regulators often start getting worried about their role. The same happened with Libra in the US, where the government was reluctant to allow Facebook to

pursue monetary experiments. Therefore, regulators will most likely step in whenever a private means of payment becomes too influential by either imposing stricter regulation or by issuing their own CBDC.

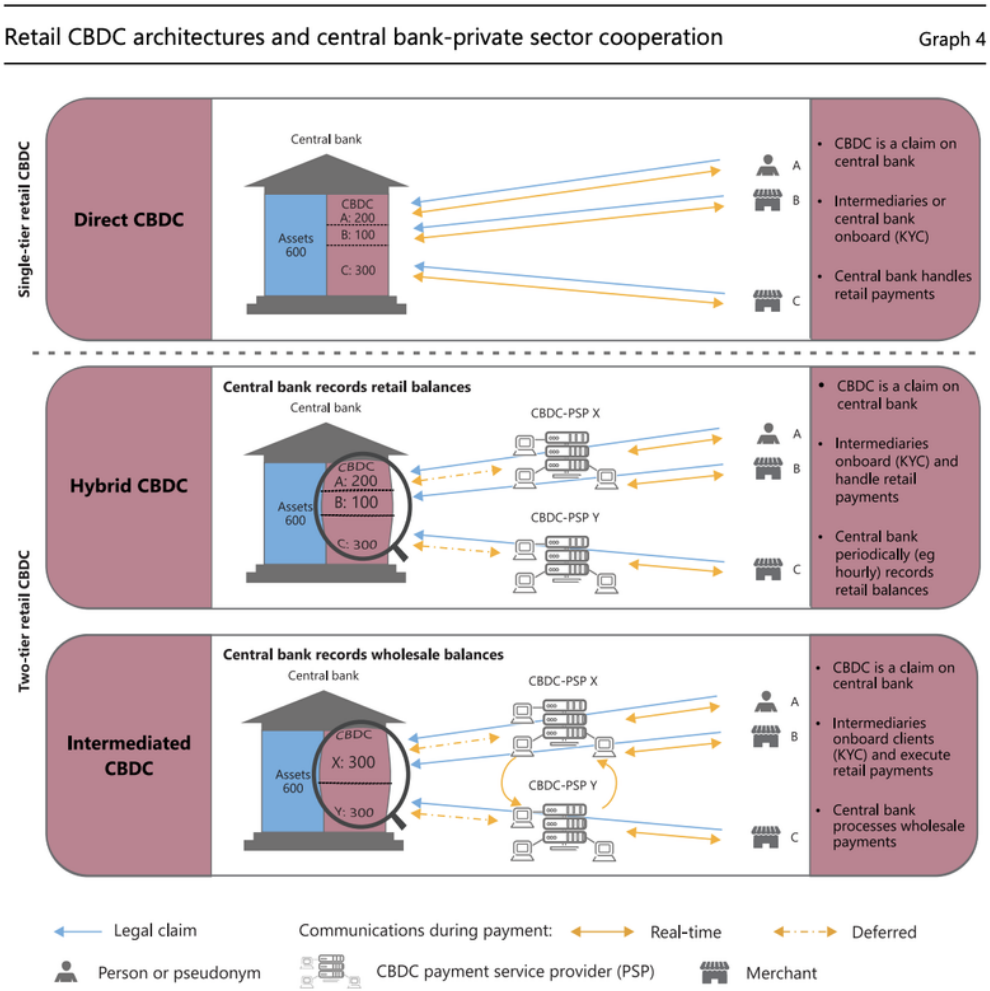

Figure 4: Retail CBDC design. Source: BIS

Question 3

Francesco: *We read your article published in the Financial Times-Alphaville titled "CBDCs must be coupled with greater accountability." In this article, you focused on the influence of CBDC on*

the balance sheet of Europe Central Bank and Federal reserve. Can you summarize the pros and cons of introducing CBDCs for different stakeholders, such as central banks, commercial banks, and individuals?

Luciano: From a consumer's perspective, the advantages of CBDCs are **quite marginal**. Domestic and cross-border transactions might be cheaper and faster. It might also be easier for merchants to offer different virtual transaction. On the other hand, the introduction of CBDCs will have a larger impact on commercial banks, who might see a d**ecrease in the number of deposits**. If commercial banks do lose deposits, then it will become much harder for them to offer complimentary financial services, and they could no longer draw on deposits as their main source of funding. Central banks can potentially address this problem by collecting deposits and funding commercial banks directly. Under such scenario, commercial banks would still be able to retain all customer data, provide complimentary services, and attract new customers. Ultimately, central banks will be the ones who will experience the biggest change from the introduction of a CBDC since they will have retailers in their balance sheet, regardless of whether CBDCs will be distributed through them or via banks. A direct channel between central banks and retailers will result in **more targeted monetary policies** at the expense of customers' privacy. Furthermore, part of what my research has been focusing on, introducing a CBDC under quantitative easing programs may have profound consequences on a central bank's ability to **reverse its expansionary monetary policies**. When commercial banks use their excess reserves to allow depositors to convert bank deposits into CBDC deposits, retailers become the new creditors of the central bank. Then, it might be more difficult – yet not impossible – to convince retailer to give back their deposits when a central bank is determined to taper its balance sheet. So, tapering a balance sheet when liabilities are in the hand of retailers is much harder, rendering QE program quasi-permanent eventually.

Figure 5: ECB and Fed's balance sheets from 2006 to 2022. Source: Federal Reserve Bank of St. Louis

Question 4

Francesco: *How will a CBDC affect the effectiveness of monetary policy during period of financial crisis? Will CBDC deteriorate or mitigate inflation?*

Luciano: In terms of the effectiveness of monetary policy in times of financial crises, central banks can benefit from CBDCs because they will be able to implement more targeted monetary policies, by directly affecting households' deposits. This might facilitate the **integration of fiscal and monetary policies**, thus blurring the line between the responsibilities of the central bank and those of the fiscal authorities. Also, you might see central banks trying to do much more precise targeting of inflation because the instrument is much better at **micromanaging monetary policies**. On the other hand, the problem may arise in the long-term where people will start to think that central banks have monetary superpowers and can print money indefinitely, resulting in changes in inflation expectation. As you can imagine, it becomes very difficult to predict the general equilibrium effect of CBDCs on inflation.

The question that policymakers ought to be asked is: "Do the benefits of introducing a CBDC outweigh the costs? And is the risk worth taking?" In my opinion – which is not reflected in my research – the risks of introducing a CBDC are enormous. When assessing the risks associated with this technology, central bankers should consider the effects in 20 or 30 years, regardless of whether CBDCs will be used only for payments or other more sophisticated purposes.

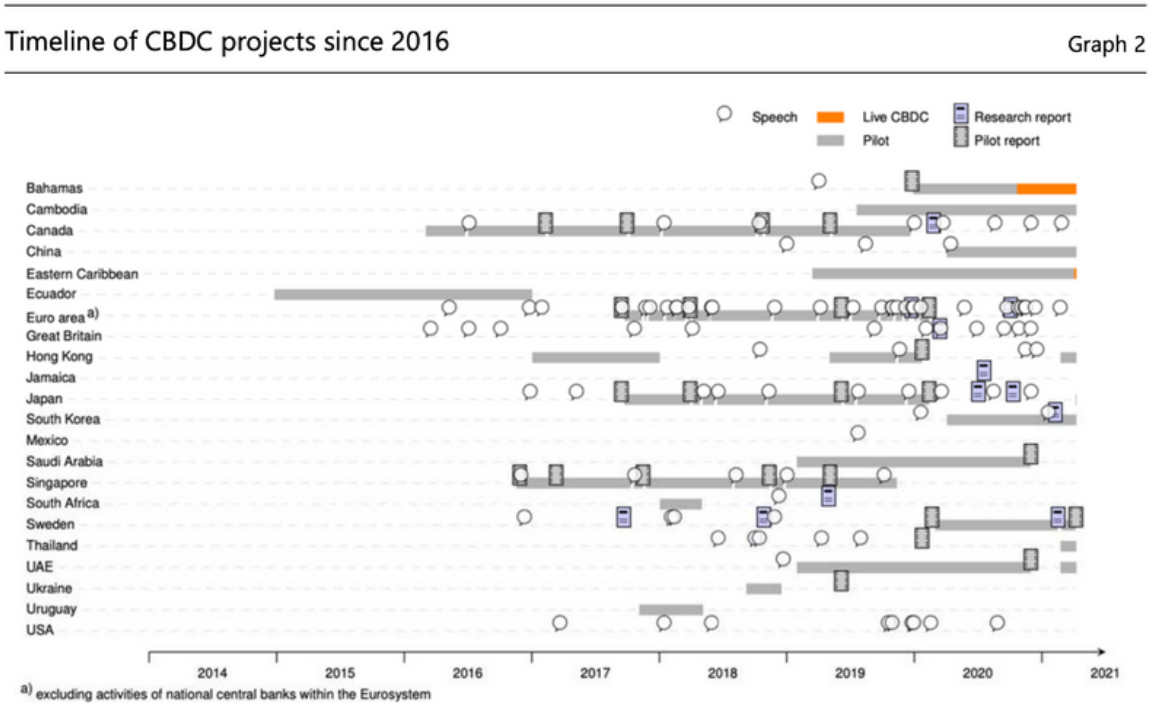

Figure 6: Timeline of CBDC projects. Source: BIS

Part IV: Signature Work Documents

[Include URLs to all the signature work documents submitted to the signature work office. If the document is not applicable, leave the information blank.]

Document type	URL to PDF	date submitted
SW Declaration of Intent		
SW Mentor Agreement Form		
Team-Based Project Agreement Form		
SW Project Proposal Form		
SW Experiential Learning Proposal Form		
SW Experiential Learning Report Form		
SW Experiential Learning Supervisor Report Form		
RCR Certificate		
Petition to Change SW Project Proposal Form		
Capstone Course Schedule Change Request		