

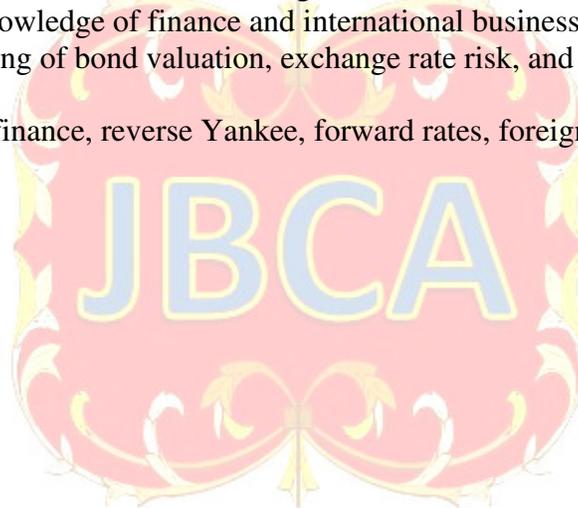
## Are Reverse Yankee Eurobonds Suitable for Imagen?

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### ABSTRACT

Imagen, Inc. is a diversified medical technology company whose objective is to become the market leading health-care provider within the segment of women's health. Imagen's current strategy is to diversify its product line and expand into international markets through acquisitions of existing pure-play competitors currently operating in both developed and emerging markets. In order to raise capital for the proposed acquisitions, Imagen is considering either a domestic bond offering denominated in US dollars or a reverse Yankee euro denominated eurobond. Students are asked to evaluate the bond issues under the condition of a subsequent successful acquisition of either a foreign or US based target company while considering the impact of exchange rate movements on the cost of financing. The fictional case requires students to possess a fundamental knowledge of finance and international business and is designed to enhance their understanding of bond valuation, exchange rate risk, and currency hedging.

Keywords: International finance, reverse Yankee, forward rates, foreign currency, risk management



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## INTRODUCTION

Imagen, Inc. is a medical technology company whose products are primarily used in the healthcare industry segment devoted to women's health. The company has three main operating divisions: Breast Health, Surgical, and Skeletal. Breast Health is devoted to the treatment of breast cancer care via surgery, pathology and radiology. The Surgical division provides devices for the treatment of abnormal bleeding and the removal of tumors within the uterus. Skeletal Health products measure bone density and perform body composition assessment for orthopedic surgical procedures. Imagen, Inc. sales are derived from a network of direct sales representatives and service contracts, as well as independent contractors. The primary customers for Imagen are hospitals, laboratories, and healthcare providers specializing in ob-gyn, radiology, dermatology and surgery.

The Breast Health segment is the largest division in terms of contribution to sales at 65%, with Surgical and Skeletal Health contribution to sales at 28% and 7% respectively. Within Breast Health, digital imaging devices are the largest driver of both sales and gross margins. Imagen's Surgical division has experienced steady growth. Long standing relationships with OB/GYN providers has effectively delivered 6%-11% revenue growth over the last seven years. Imagen's Skeletal Health segment, which is the smallest segment, has suffered from lower reimbursement rates and is forecasted to decline slightly over the next three years. Absent a change in strategy, Breast Health and Surgical will continue to drive sales growth with digital imaging remaining the most important cash flow contributor.

Imagen's strategy to further diversify its product offerings has proved difficult. The reliance on Breast Health, and more specifically digital imaging, to promote other divisions within the company assumes Imagen will be able to maintain its market leading 60% share of digital mammography in the US. Imagen has continued to invest heavily in research and development in order to maintain market share and brand superiority. Significant R&D expenditures are used to update 3-D imaging devices. However, larger conglomerates such as GE and Siemens are direct competitors in this important segment and remain an imminent threat to Imagen's dominant position. Imagen must continue to spend heavily to retain superior technological advantages in the digital imaging space, yet recognizes the need to diversify its product line.

## CURRENT SITUATION

The vulnerability of digital imaging to larger conglomerates has led Imagen to explore potential acquisition targets which will allow for product diversification and entry into international markets. Imagen currently has minimal access to developed markets which the company feels they must infiltrate in order to enhance their position within the digital imaging segment. Access to developed markets will provide a gateway into emerging markets which the company categorizes as essential to long-term consistent earnings growth. In order to capitalize on the notoriety of company within digital imaging, Imagen believes it will need to expand into the diagnostic health-care segment which is better suited for eventual entry into emerging markets. Imagen feels the quickest and most productive way to achieve an international presence is through an acquisition of an existing diagnostic company with ties to developed markets.

Imagen has identified two potential targets, BioLabs and DeltaHealth. BioLabs is a German diagnostic company specializing in cervical cancer screening devices sold throughout Europe and the United States. In addition, BioLabs has recently launched a soft expansion into Asia, India and Brazil. DeltaHealth is a US based diagnostic company that develops and distributes diagnostic tests and reagents used by pharmaceutical and biotechnology companies. DeltaHealth is divided into three operating segments, US Diagnostics, European Diagnostics, and Life Science. The European Diagnostics segment consists of the sale and distribution of diagnostic kits in Europe, Africa and the Middle East. DeltaHealth generates about 40% of revenue from outside the US.

Imagen's finance division had been involved in many of the strategy meetings regarding the proposed acquisitions. In order to fund potential acquisitions, Imagen will need additional capital. Imagen has been in talks with multiple investment banks and representatives from BAC Capital indicated Imagen could raise around \$500 million through the issuance of 5.25% semi-annual coupon bonds with a maturity of seven years. The bonds could be sold at face value but included a 1% up-front fee. HS Bank representatives were negotiating with Imagen as well. HS Bank was suggesting Imagen consider a reverse Yankee eurobond offering. Reverse Yankee bonds are simply bonds issued by a U.S. company outside the U.S. and denominated in a currency other than U.S. dollars. HS Bank noted that U.S. nonfinancial companies had issued more than €100 billion in reverse Yankee corporate bonds in 2019 with an average maturity of just under nine years, up from €40 billion in 2018 (Hirtenstein and Minczeski, 2020). HS Bank was confident Imagen could issue €500 million in reverse Yankee eurobonds with a 4.0% annual coupon and a seven-year maturity. The reverse Yankee bonds would likely sell at 95% of par value and included a 1.2% up-front fee. If Imagen wanted to hedge the currency exposure associated with the reverse Yankee bond, HS Bank included a sample exchange rate spot/forward quote sheet on the Euro-US dollar (EUR:USD) as of 12 pm on July 1<sup>st</sup> as a reference.

#### **Exhibit 1: Forward Rate Quote on July 1st, 2020**

		<b>Bid</b>	<b>Ask</b>
EUR:USD	Spot rate	1.1215	1.1285
Forward	1-month	8.1	8.6
	1-year	92	99
	2-year	185	195
	3-year	295	305
	4-year	413	433
	5-year	551	571
	6-year	696	736
	7-year	859	899

HS Bank noted that the forward rate is the spot rate on the transaction date plus a premium, known as forward points. The EUR:USD is a direct quote that represents the value of one euro expressed in US dollars. The spot ask rate (\$1.1285/1 euro) is the rate a buyer would pay to purchase euros today. The spot bid rate (\$1.1215/1 euro) is the rate a seller would receive if they sold euros today. The forward points are derived from the interest rate differential between the two currencies and if the interest rate on the US dollar exceeds the interest rate on

the euro, the premium is positive. A positive premium indicates forward points would be added to the spot rate. Because the spot rate is quoted to the fourth decimal place, the points represent 1/10,000. For example, if Imagen wanted to lock in a rate to buy euros one year from now, the forward rate would be calculated as the current ask spot rate plus the ask forward points. The forward exchange rate would be  $1.1285 + 99/10,000$  or  $1.1285 + .0099 = 1.1384$ . This results in a forward quote representing an exchange rate of \$1.1384/1 euro.

## TASKS TO BE PREPARED

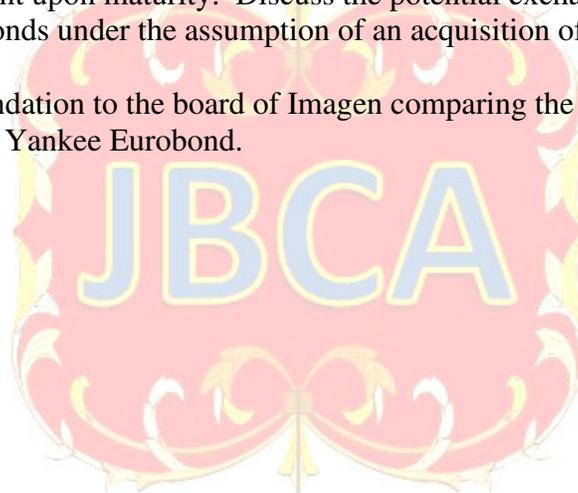
Imagen's finance division is most concerned with comparing the all-in annualized cost of each bond issue. Additional considerations include the possibility of hedging the potential foreign currency exchange rate risk associated with the reverse Yankee eurobond issue. Assume the role of a member of the finance division and address the following questions related to the competing bond issues:

	<u>U.S. Dollar Bond</u>	<u>Reverse Yankee Eurobond</u>
Par Value:	\$500 million	€500 million
Price as a Percentage of Par Value:	100%	95%
Coupon Rate:	5.25%	4.0%
Frequency of Coupon Payment:	Semi-Annual	Annual
Final Redemption:	Par	Par
Fees:	1.0%	1.2%

- 1) Prepare a spreadsheet to specify the cash flows associated with the two potential bond offerings. The up-front fees must be subtracted from the Par value of the bond in order to determine the initial capital raised from each bond issue.
- 2) Assume Imagen would like to fully hedge the exchange rate risk of the reverse Yankee bond offering using the forward rate quote sheet. Calculate the U.S. dollar hedged cash flows for the reverse Yankee Eurobond offering using a series of forward rate hedges.
- 3) Compare the annualized all-in cost of the U.S. dollar bond to the forward rate hedged reverse Yankee bond. The internal rate of return that equates the U.S. dollar payments to the initial U.S. dollar received, net of fees is used to estimate the annualized all-in cost.
- 4) Assume Imagen does not use forward contracts to hedge the currency risk associated with reverse Yankee eurobond and has no other euro inflows to repay the bond. Calculate the all-in cost of the reverse Yankee eurobond under the following scenarios:
  - a. Strengthening euro scenario: The euro is currently trading at a bid of 1.1215 and an ask of 1.1285. Assume the euro strengthens by 2% per year for the next seven years.
  - b. Weakening euro scenario: The euro is currently trading at a bid of 1.1215 and an ask of 1.1285. Assume the euro weakens by 2% per year for the next seven years.
- 5) Assume Imagen does not use forward contracts to hedge the exchange rate risk of the reverse Yankee bond offering and is able to negotiate a successful acquisition of the German firm BioLabs. In this scenario, the euro inflows from the reverse Yankee bond

issue can be used to fund the initial acquisition. Preliminary analysis of this acquisition indicated that the cash inflows from operational expansion into eurozone markets could be used to repay coupons on the debt and surplus euros could be placed on deposit to satisfy the principal repayment upon maturity. Calculate the all-in cost of the reverse Yankee eurobond under the assumption of a successful BioLabs acquisition which would result in euros inflows sufficient to repay both the euro denominated coupons and principal.

- 6) Assume Imagen does not use forward contracts to hedge the exchange rate risk of the reverse Yankee bond offering and is unsuccessful in acquiring the German firm BioLabs. However, Imagen is successful in the acquisition of the US firm DeltaHealth. In this scenario, the euro inflows from the reverse Yankee bond issue must be converted to US dollars for the initial acquisition of DeltaHealth. Preliminary analysis of a DeltaHealth only acquisition would provide sufficient euro cash inflows from operational expansion into eurozone markets via DeltaHealth to repay annual euro coupons. However, the acquisition of DeltaHealth will not provide sufficient excess euros needed to satisfy the principal repayment upon maturity. Discuss the potential exchange rate risk of issuing reverse Yankee bonds under the assumption of an acquisition of DeltaHealth.
- 7) Make a recommendation to the board of Imagen comparing the U.S. dollar bond issue versus the reverse Yankee Eurobond.



## REFERENCES

Hirtenstein, A. & Minczeski, P. (2020). Europe's Cheap Debt Draws Record Borrowing by U.S. Companies. *Wall Street Journal*. Retrieved from: <https://www.wsj.com/articles/europes-cheap-debt-draws-record-borrowing-by-u-s-companies-11579519964>.

NOTE: This is a fictitious case. All information contained herein was fabricated by the author. Any similarity contained herein is purely coincidental and is the responsibility of the author. Please contact the author directly with any concerns.



**INSTRUCTOR'S NOTES**

**Answer to Question 1:** The U.S. dollar bond offering matures in seven years and is assumed to sell at par value. The U.S. dollar bond has a par value of \$500 million and a 5.25% coupon paid semi-annually. The initial cash received from this offering is the \$500 million minus the up-front fee. The fee is expressed as a percentage of the par value of the bond and is a 1% up-front fee. The dollar value of the up-front fee is 1% of \$500 million or \$5 million. The initial cash flow received by Imagen would be \$495 million. The semi-annual coupon interest payments are \$500 million \* 5.25%/2. Each coupon payment is \$13.125 million. The final payment would include the last coupon payment plus the par value of the bond equal to \$13.125 million plus \$500 million.

The reverse Yankee eurobond has a par value of 500 million euros, 4% annual coupon, seven years to maturity, and is assumed to sell at 95% of par. Up-front fees are 1.2% of the par value. The initial cash flow from reverse Yankee bond are equal to €500 million\*0.95 minus the upfront fees of €500 million\*1.2%. The initial cash flow is calculated as €475 million minus €6 million or €469 million. The annual coupon payments are 4% of the par value of the bond, equal to €20 million. At maturity, the €500 million par value will be repaid along with the final coupon payment of €20 million.

<b>US\$ Bond Offering</b>								
Year	0	0.5	1	1.5	2	2.5	3	3.5
US\$ (mil)	\$495	-\$13.125	-\$13.125	-\$13.125	-\$13.125	-\$13.125	-\$13.125	-\$13.125
Year		4	4.5	5	5.5	6	6.5	7
US\$(mil)		-\$13.125	-\$13.125	-\$13.125	-\$13.125	-\$13.125	-\$13.125	-\$513.125

<b>Reverse Yankee Eurobond</b>								
Year	0	0.5	1	1.5	2	2.5	3	3.5
Euro Cash Flows (mil)	€469		-€20		-€20		-€20	
Year		4.0	4.5	5.0	5.5	6.0	6.5	7.0
Euro Cash Flows (mil)		-€20		-€20		-€20		-€520

**Answer to Question 2:** The exchange rate is quoted as a direct quote with the euro as the base currency and the U.S. dollar as the quote currency. The appropriate exchange rate for the initial euro cash flow received from the bond would be the bid rate of \$1.1215/1 euro. The year one coupon payment would require Imagen to purchase €20 million a year from now. The spot ask rate (to purchase euros today) is 1.1285 and the forward points to purchase euros in 1 year is 99. This implies that the one year forward rate to purchase euros is equal to 1.1285 plus 99/10,000 (1.1285 plus .0099) or 1.1384. The resulting U.S. dollar cash payment of \$22.768 million is calculated as €20 million \* \$1.1384/€1. Similar calculation are used to find the remaining forward rates and U.S. dollar equivalents.

<b>Reverse Yankee Eurobond</b>			
Year	Euro Cash Flow (millions)	Exchange Rate (EUR-USD)	US\$ Cash Flow (millions)
0	€469.000	1.1215	\$525.9835
1	-€20.000	1.1384	-\$22.7680
2	-€20.000	1.1480	-\$22.9600
3	-€20.000	1.1590	-\$23.1800
4	-€20.000	1.1718	-\$23.4360
5	-€20.000	1.1856	-\$23.7120
6	-€20.000	1.2021	-\$24.0420
7	-€520.000	1.2184	-\$633.5680

**Answer to Question 3:**

<b>US\$ Bond</b>								
Year	0	0.5	1	1.5	2	2.5	3	3.5
US\$ (mil)	495.000	-13.125	-13.125	-13.125	-13.125	-13.125	-13.125	-13.125
Year	4	4.5	5	5.5	6	6.5	7	
US\$ (mil)	-13.125	-13.125	-13.125	-13.125	-13.125	-13.125	-513.125	
Periodic IRR	2.71%							
Nominal APR	5.42%							
Effective Rate	5.50%							

The periodic Internal Rate of Return for the U.S. dollar bond is 2.71% per six-month period, which results in a nominal annual percentage rate (APR) of 5.42% ( $2.71\% \times 2 = 5.42\%$ ). A more appropriate comparison would be to use the effective annual rate of the U.S. dollar bond relative to reverse Yankee bond. The effective annual rate (or annual percentage yield) is calculated as:  $\text{Annual Percentage Yield} = (1 + \text{APR}/2)^2 - 1$ . The effective annual rate of the U.S. bond offering is 5.50% resulting in a more comparable annualized all-in cost of 5.50%.

<b>Reverse Yankee Eurobond</b>			
Year	Euro Cash Flow (millions)	Exchange Rate (EUR-USD)	US\$ Cash Flow (millions)
0	€469.000	1.1215	\$525.9835
1	-€20.000	1.1384	-\$22.7680
2	-€20.000	1.1480	-\$22.9600
3	-€20.000	1.1590	-\$23.1800
4	-€20.000	1.1718	-\$23.4360
5	-€20.000	1.1856	-\$23.7120
6	-€20.000	1.2021	-\$24.0420
7	-€520.000	1.2184	-\$633.5680
			Annual IRR
			6.32%

The reverse Yankee Eurobond hedged to U.S. dollars using the forward rates provided has an internal rate of return of 6.32%. With annual coupon payments, the annualized all-in cost of the hedged reverse Yankee is 6.32%.

**Answer to Question 4a: Strengthening euro scenario:** The strengthening of the euro will result in an increased dollar cost associated with the repayment of debt. The most significant exchange rate occurs at maturity when the principal repayment is due.

<b>ReverseYankee Eurobond</b>			
Year	Euro Cash Flow (mil)	Exchange Rate (EUR-USD)	US\$ Cash Flow (mil)
0	€469.00	1.1215	\$525.98
1	-€20.00	1.1511	-\$23.02
2	-€20.00	1.1741	-\$23.48
3	-€20.00	1.1976	-\$23.95
4	-€20.00	1.2215	-\$24.43
5	-€20.00	1.2460	-\$24.92
6	-€20.00	1.2709	-\$25.42
7	-€520.00	1.2963	-\$674.07
			Annualized all-in cost 7.28%

**Answer to Question 4b: Weakening euro scenario:** A weakening of the euro will lower the dollar cost of repayment of debt. The most significant exchange rate occurs at maturity when the principal repayment is due.

<b>ReverseYankee Eurobond</b>			
Year	Euro Cash Flow (mil)	Exchange Rate (EUR-USD)	US\$ Cash Flow (mil)
0	€469.00	1.1215	\$525.98
1	-€20.00	1.1059	-\$22.12
2	-€20.00	1.0838	-\$21.68
3	-€20.00	1.0621	-\$21.24
4	-€20.00	1.0409	-\$20.82
5	-€20.00	1.0201	-\$20.40
6	-€20.00	0.9997	-\$19.99
7	-€520.00	0.9797	-\$509.43
			Annualized all-in cost 3.08%

**Answer to Question 5:** The acquisition of BioLabs would allow Imagen to avoid the exchange rate risk of the reverse Yankee bond offering. The all-in cost of the of reverse Yankee Eurobond absent any exchange rate risk would be 5.07%.

<b>Reverse Yankee Eurobond</b>								
Year	0	1	2	3	4	5	6	7
Euro Cash Flow (mil)	€469	-€20	-€20	-€20	-€20	-€20	-€20	-€520
Annualized all-in cost								
5.07%								

**Answer to Question 6:** The initial cash inflows from the reverse Yankee bond offering will need to be exchanged into U.S. dollars to pay for the acquisition of U.S. based DeltaHealth. However, the spot rate today is known so there is minimal exchange rate risk at the time of the issuance (the exchange rate risk is limited to the time between the issue date and the date of fulfillment, but this risk could be hedged with a flexible forward contract). If reverse Yankee coupons payments are made with euro inflows from operational expansion into Euro zone markets, exchange rate risk of the coupon payments is eliminated. However, the principal repayment of the reverse Yankee represents about 75% of the value of the bond.  $\{[500 \text{ million euros} / (1.0507)^7] / 469 \text{ million euros}\}$  The acquisition of DeltaHealth would still present significant exchange rate risk with regards to the principal repayment. If the exchange rate at the time of the principal repayment is below the current spot rate today (weaker euro), the all-in cost of the reverse Yankee will be less than the annualized all-in cost of 5.07% associated with a no exchange rate risk scenario (BioLabs acquisition). However, if the euro were to strengthen and Imagen left the principal repayment unhedged, then the annualized all-in cost would be more than the annualized all-in cost of 5.07%.

**Answer to Question 7:** The U.S. dollar bond offering has an annualized effective all-in cost of 5.5% which is lower than the hedged annualized all-in cost of the reverse Yankee eurobond at 6.32%. However, if Imagen is planning to expand operations into the eurozone, the cash flows from operations in the eurozone will eventually need to be converted to U.S. dollars. The advantage of the reverse Yankee eurobond is evident if Imagen is able to successfully acquire the German firm BioLabs. The euros raised from the reverse Yankee eurobond can be used in the purchase of BioLabs thus eliminating the exchange rate risk associated with the acquisition of a foreign entity. The cash inflows from the operations can be used to repay both the coupon payments and the final principal repayment. The reverse Yankee eurobond provides both a means to offset the currency exposure of a foreign acquisition and does so at a lower all-in annualized cost of 5.07%.

There is more uncertainty concerning the decision to raise capital from a reverse Yankee eurobond if Imagen is only successful in the acquisition of U.S. based DeltaHealth. The euros raised would need to be exchanged into U.S. dollars to pay for the acquisition of DeltaHealth. The exposure of risk is limited to the time between the decision date and the fulfillment date and could be eliminated by the use of a flexible forward contract. The DeltaHealth acquisition would provide enough euro inflows to repay the coupon payments but not enough to repay the entire principal repayment. The shortfall of euros needed for repayment of the principal will need to come from U.S. dollar inflows that will need to be exchanged into euros. A weakening of the euro below current levels would further lower the cost of the reverse Yankee bond. If the euro

were to strengthen, the annualized all-in cost of the reverse Yankee bond would increase. As the principal repayment represents over 75% of the value of the bond, this risk is not insignificant. A strengthening of the euro above 1.1591 would imply an annualized all-in cost of the reverse Yankee bond in excess of the U.S. dollar denominated bond. However, the issuance of the U.S. dollar denominated bond combined with a successful DeltaHealth acquisition only would still expose Imagen to exchange rate risk associated with euro inflows from eurozone operations. Assuming Imagen is likely to succeed in the acquisition of German based BioLabs, the reverse Yankee Bond would be highly recommended as it offers a lower annualized all-in cost and the elimination of exchange rate risk associated with the initial acquisition and future euro inflows from eurozone operations. The reverse Yankee bond could also be recommended in the case of an unsuccessful acquisition of BioLabs, but a successful acquisition of U.S. based DeltaHealth. The additional downside risk of the DeltaHealth only acquisition is the principal repayment at maturity of the reverse Yankee bond. A strengthening euro might result in a higher annualized all-in cost of the reverse Yankee bond relative the U.S. dollar denominated bond, but this is offset by the elimination of exchange rate risk associate with euro inflows from eurozone operations. If Imagen decides to abandon their strategy of expansion into the eurozone market and pursues domestic expansion only, then the U.S. dollar bond offering would be recommend as it offers a lower annualized all-in cost relative to a hedged reverse Yankee bond offering.

