



duolingo

Investment Recommendation



HEADLINER
CAPITAL



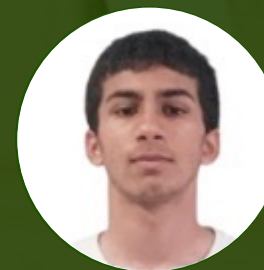
Nathan Yuan



Eva Lin



Ella Fu

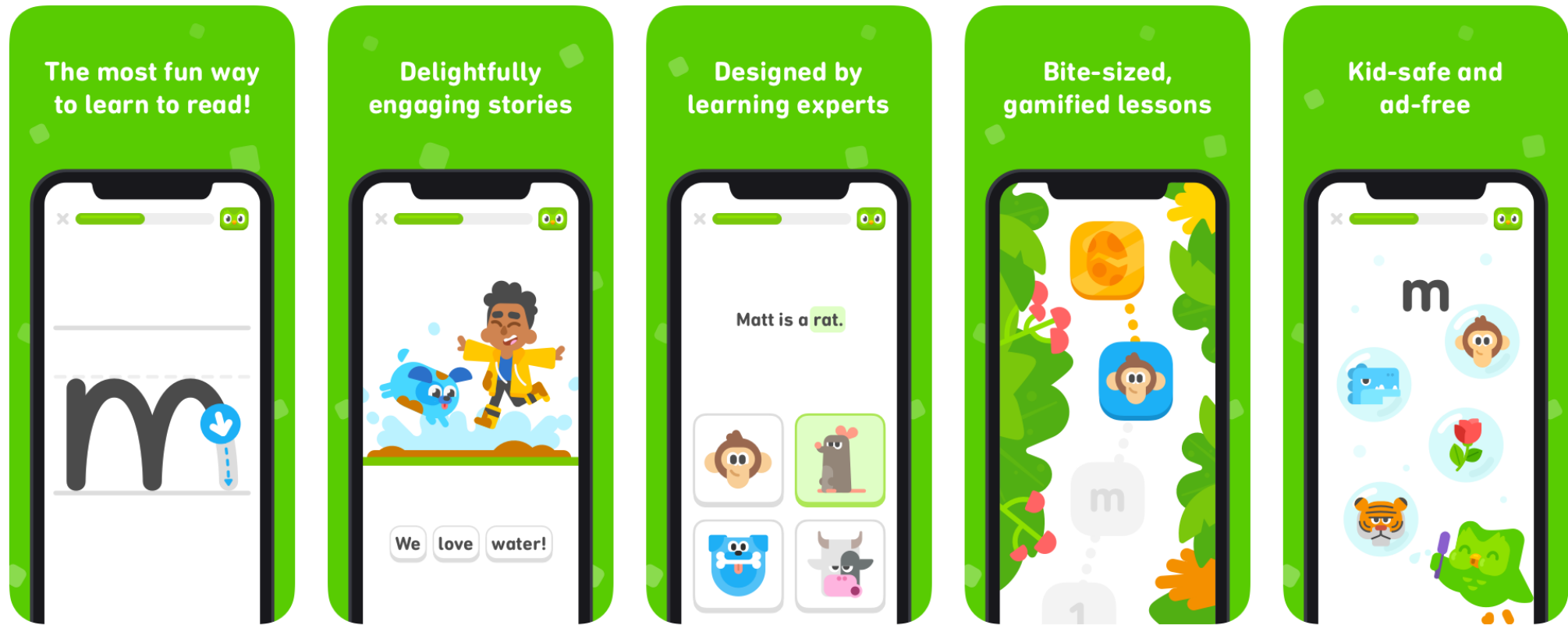


Ashwin Rao

tdm.
GROWTH PARTNERS

**Future
IM/Pact**

An online *language-learning* platform and mobile application which provides interactive lessons to learners worldwide



Established in 2011 Pennsylvania, Duolingo adopts a gamified approach **focused on language acquisition and accessibility**
Currently over 100 courses teaching **40+ languages** with over **500 million registered users** spanned across **194 countries**

Recommendation	HOLD: 36.3% Downside		
Company Overview	Duolingo maintains a 63.5% market share in the industry		
Industry Overview	Although language learning in the global scale saw growth since Covid-19, transforming consumer priorities and interests sees growth at a reduced rate in the next 5 years		
Investment Thesis	Leverage of AI drives growth but faces potential competition	Business model lacks long-term sustainability	Macroeconomic headwinds can deter consumers
Valuation	\$94.89 Targeted Share Price	22.8% 4 Year Exit IRR	24.85x Exit EBITDA multiple
Risk & Control	Rising Competition	Reliance on third-party platforms	Legal Regulations
	Increase investment in R&D	Implement direct downloads portal	Closely monitor regulatory changes

Business Overview



Duolingo is a language-learning platform and mobile application which provides interactive lessons in 40+ languages

Duolingo's Key Metrics

21.4M Daily active users (DAU)	5.2M Users subscribed to premium	\$369.5M Revenue FY22	\$428.65M Total Bookings FY22
+63% YOY	+59% YOY	+47% YOY	+46% YOY

Duolingo's Freemium Business Model

Advertising	Subscriptions	In App Purchase
Leverage free customer base by displaying advertisements	Unlocking advanced features, removal of ads Tier 1: Super Duolingo Tier 2: Duolingo Max	Learners purchasing one-time benefits within the app such as "Streak Freezes" and "Timer Boosts."
10.3%	75%	14.7%

% of Total Revenue

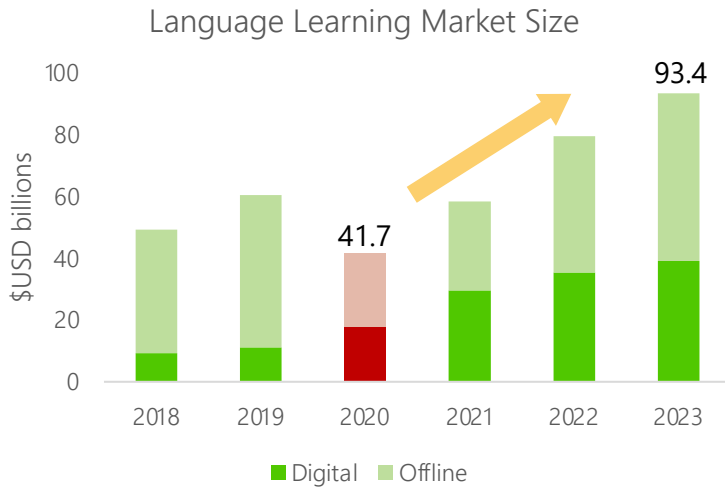
Duolingo's Points of Differentiation

- Network Economics**
Incorporates gamification elements and interactive social features within its platform
- Counter Positioning**
Duolingo was an early adopter of mobile language learning, outpacing traditional language programs
- Branding**
Strong brand image relies heavily on word of mouth, driven by its top-tier product and effective marketing

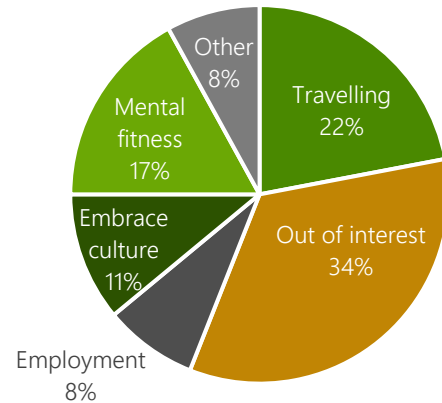
Competitive Landscape		
Language Learning Platforms	Education Platforms	Technology Companies
+Babbel FluentU Busuu Rosetta Stone	Pearson coursera udemy SKILL SHARE	Microsoft Alphabet Apple Google
<ul style="list-style-type: none"> Offer a similar service to Duolingo Duolingo dominates this sector with 63.5% market share 	<ul style="list-style-type: none"> Not specialised in language learning However, numerous language courses available 	<ul style="list-style-type: none"> Potential to disrupt the industry Investment in AI Powered Language Learning

Covid-19 has accelerated the growth of the language learning industry but is expected to decelerate due to changing consumer patterns .

Online language learning products saw a surge in interest during the pandemic



Top reasons to learn language

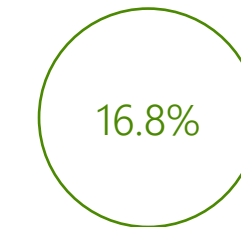


Economic recovery from Covid-19 sees moderately positive growth...

- 1 Rebounding **global travel and tourism** following the pandemic fuels demand for language learning
- 2 Rise in **globalisation** and cross-border communication boost the demand for multi-lingual individuals in the workforce
- 3 Advancements in **education technology** will further optimise product performance to drive growth in the global market

However, sustainability challenges due to changing consumer patterns can hinder the capacity for growth in the long-term

Shift in Priorities	Individuals' economic priorities may shift towards other sources of F2F leisure activities following recovery from the pandemic
Economic Uncertainties	Economic uncertainties from the pandemic reduces consumer discretionary spending on non-essential services
Cost	In a highly saturated market, competition from free resources can hinder growth
Language Attrition	Learners may find it difficult to improve proficiency without opportunities to practice in real-life situations



Expected CAGR for 2023-2028



Language Learning market size (2022)



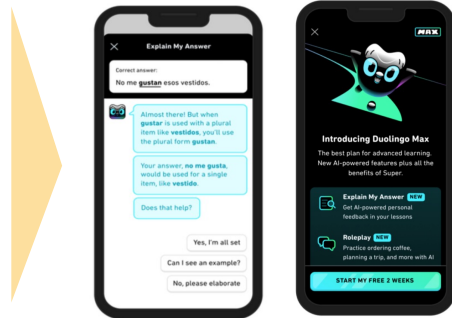
Language Learning market size (2028)

Investment Thesis 1

Duolingo's use of AI will drive growth in the short term but will be hampered over the long term by increased competition by technological powerhouses

Duolingo's Max subscription harnesses the power of AI in two fundamental ways

- 1 Introduction of the explain my answer feature, which leverages GPT-4 to help students learn more about their errors
- 2 Roleplay feature which allows learners to practice real-world conversation skills with world characters in the app



Short term growth driven by potential of AI...

Greater personalization features improves service quality thus **attracts new customers and increases user retention rate**

4.2B 2022 \gg 7.82B 2024 – Post AI

Duolingo Max **raises average subscription price** to cover additional expenses for purchasing/licensing AI software

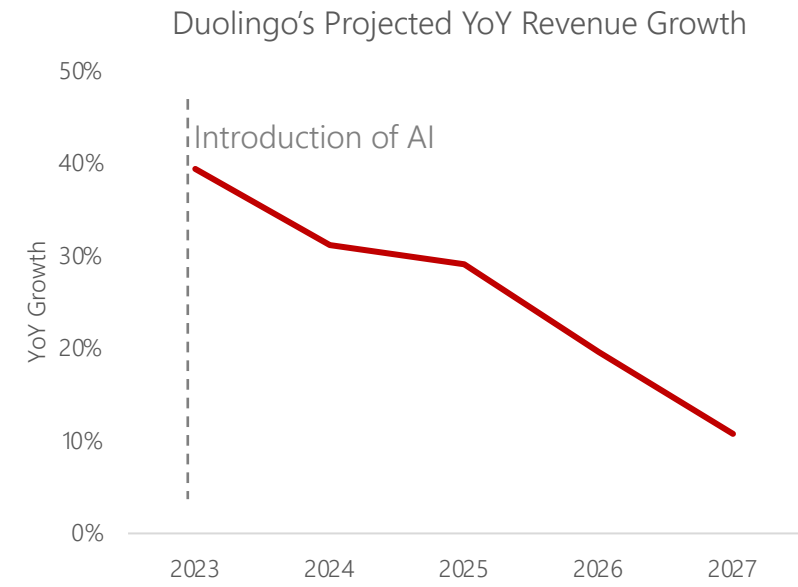
\$65 2022 \gg \$75 2025 – Post AI

However, growth may stall in the long term...

Duolingo's revenue growth is expected to **decline** in the next 5 years as technology companies are better equipped to take advantage of AI advancements with the 4 key pillars...

- 1 **Capital Capability**
 - Significant R&D and Capex expenses for Duolingo
- 2 **Superior Test Data**
 - Improve the accuracy of AI algorithms
- 3 **Technical Expertise**
 - Drive innovation and develop AI solutions
- 4 **Software Ownership**
 - A ready market for AI applications

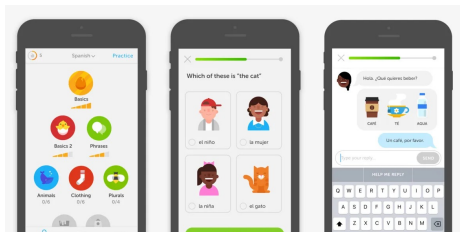
Google PaLM 2
<ul style="list-style-type: none"> ➤ Google's next-generation large language model focused on language learning ➤ Allows for sophisticated real-life translations
Apple 2024 Generative AI
<ul style="list-style-type: none"> ➤ Apple to update Siri software to include new generative AI ➤ Allow for easy, realistic translation through Siri



Despite a high historical YoY growth, Duolingo's freemium business model for its core service, the language app, is not sustainable in the long-term.

Gamified Learning System

Despite its wide-spread popularity amongst the younger generation, its interactive gamified design is insufficient to engage learners in the long term



- Over-emphasis on translation exercises
- Inefficient teaching method for how to communicate in a language

9% Average 1-month subscriber retention growth rate from 2018 to 2022

Out of all total users, **91%** were driven by personal interest

Customer Segments

Its focus on animations and gamification targets towards younger generation and beginner language learners



Target market

Duolingo's target market is **ANYONE** who wants to learn a new language.

The app is particularly popular with **students, travelers,** and people who want to **improve their job** prospects.

- Inefficient teaching method for users who aim to achieve high levels of language proficiency

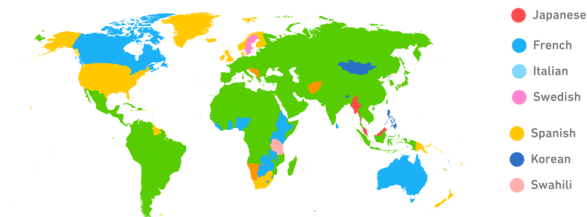
54% Users are aged 16-28 years

Students who prefer a F2F language learning environment grew by **16%** from 2021-2022

Content Quality

While user-generated content can be valuable, crowdsourcing content can result in inconsistencies and variations in the quality of courses

Most popular language studied on Duolingo in each country in 2022



- Duolingo is challenged to maintain the quality of its free courses while generating revenue

0.1% Average completion rate of each language course

Duolingo offers over **100** courses teaching 40+ languages



5% of total users opt for the subscription plan in 2023

Duolingo's growth of subscriber retention cannot be sustained indefinitely in next 5 years of post-covid.

Investment Thesis 3



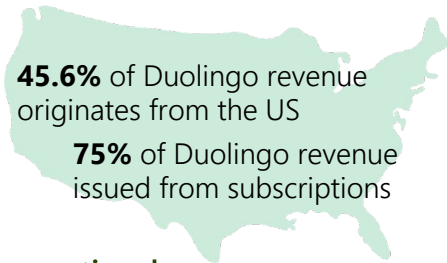
Duolingo faces macroeconomic headwinds that may deter core consumers in the high inflationary business environment.

Duolingo face consistent interest rate hikes in their primary geography

US FED Funds Rate continues to climb ushering in high inflationary environments where consumer spendings on premium and non-essential offerings are discouraged.

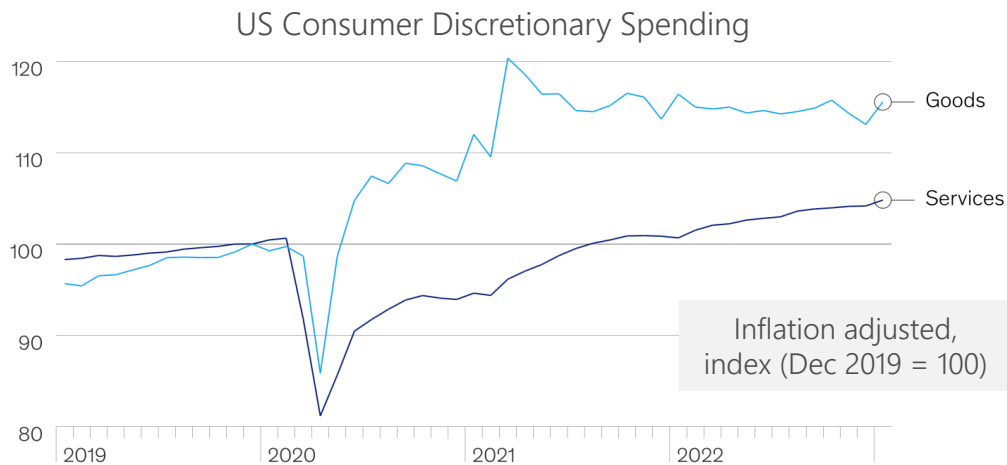
45.6% of Duolingo revenue originates from the US

75% of Duolingo revenue issued from subscriptions



US Consumers are still spending, but very cautiously

As Covid-19 has faded from the forefront of consumer concern, spending continues, but growth in real terms is **slowing**.



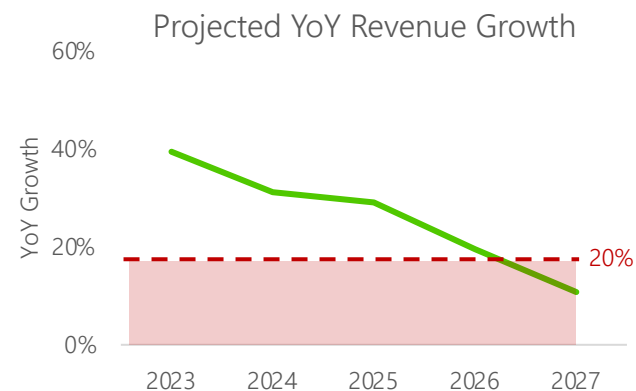
74% consumers are seeking value in their consumption behaviour by trading down for necessities and low-cost options

Consumers are **2x** as pessimistic about the economy today than they have been throughout the pandemic

Despite growth in total users, total revenue is beginning to plateau...

- 1 Reduced Consumer Purchasing Power** - Consumer tend to prioritise basic necessities over discretionary spending
- 2 Subscription Price Pressure** - Increased price to cope rising costs can deter price-sensitive consumers
- 3 Competition against Free Alternatives** - Free or low-cost resources become attractive, leading to user attrition
- 4 Ad Revenue Decline** - Reduced advertising budgets and shift in advertiser preferences
- 5 Global Expansion Challenges** - Economic instability makes it difficult to predict and meet consumer demands

As such, Duolingo sees its industry valuations fall despite new initiatives



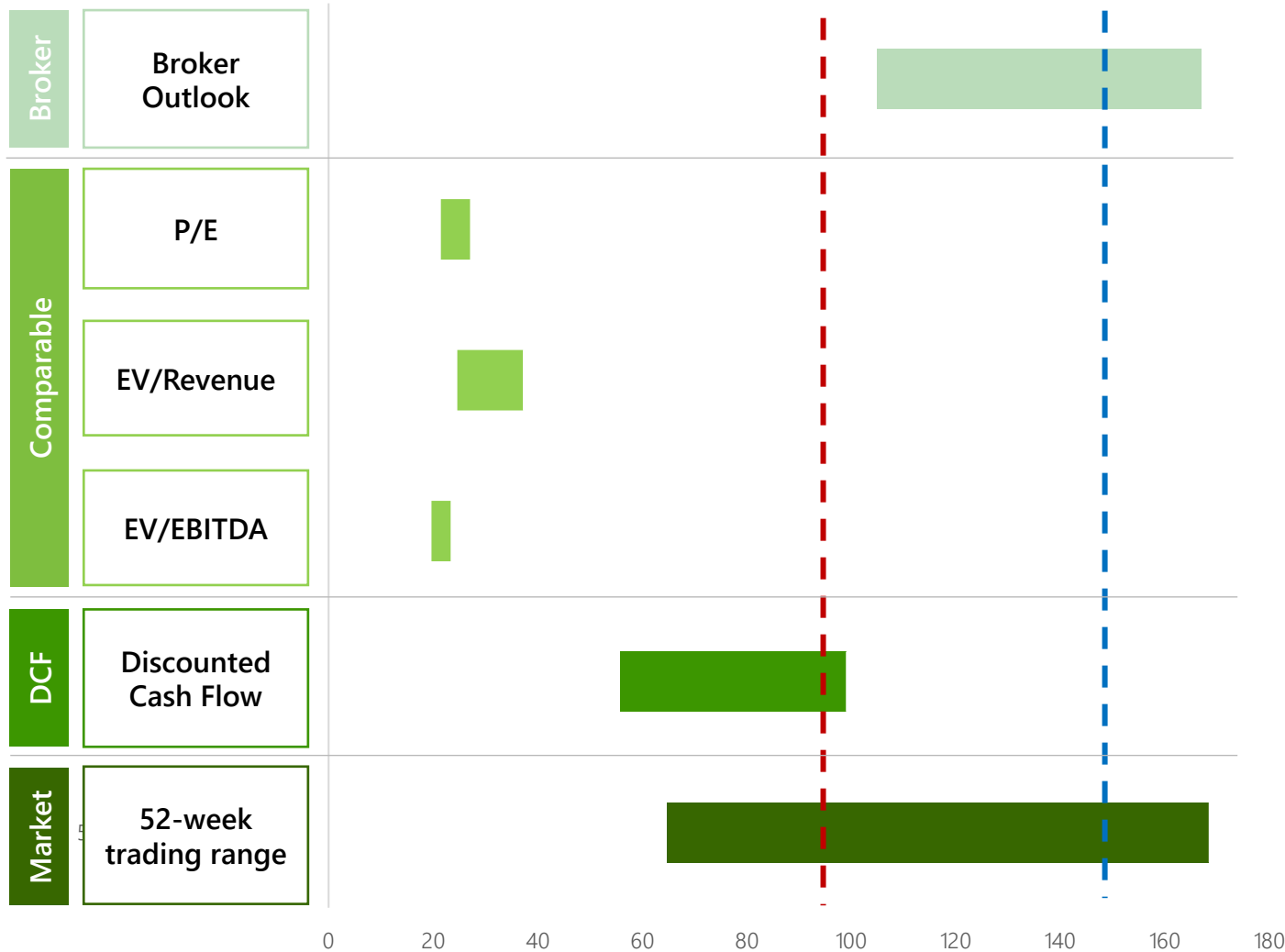
In the current economic conditions, consumer spending patterns are unlikely to change

Duolingo will be challenged to sustain its revenue growth at target rate of **20%** p.a.

Valuation



Despite strong revenue growth in the coming years, it is not enough to justify the current share price of \$148.92



Key Insights

\$148.92 Current Price (2 Sep 2023)	→	\$94.89 Target Price	36.3% Downside
88.01x Current EBITDA multiple	→	24.85x Exit EBITDA multiple	22.8% 4 Year Exit IRR

Base Price Sensitivity Analysis

		WACC					
		56.44	10.46%	10.71%	10.96%	11.21%	11.46%
Terminal Growth Rate	1.0%	55.16	53.84	52.59	51.40	50.27	
	1.5%	57.23	55.78	54.41	53.12	51.89	
	2.0%	59.54	57.94	56.44	55.02	53.68	
	2.5%	62.13	60.37	58.71	57.14	55.67	
	3.0%	65.08	63.11	61.26	59.53	57.90	

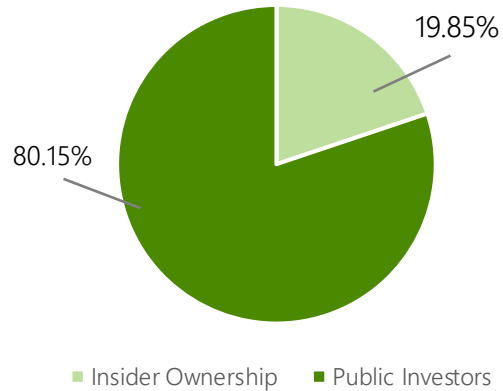
		WACC					
		120.18	10.46%	10.71%	10.96%	11.21%	11.46%
EBITDA Exit Multiple	23.85	118.52	117.35	116.20	115.05	113.93	
	24.35	120.56	119.37	118.19	117.02	115.88	
	24.85	122.60	121.38	120.18	118.99	117.82	
	25.35	124.64	123.40	122.17	120.96	119.77	
	25.85	126.67	125.41	124.16	122.93	121.72	

Management, People, and Culture



Duolingo's management leverages extensive expertise in the consumer technology sector to drive the company's growth while upholding a robust company culture

Duolingo possesses a desirable level of insider ownership



Duolingo's management team comes from a wide range of backgrounds



Luis von Ahn, (CEO)

Prior CEO of reCAPTCHA



Matthew Skar, (CFO)

Prior Vice President of Goldman Sachs



Natalie Glance, (CEO)

Prior Manager (Eng) at Google

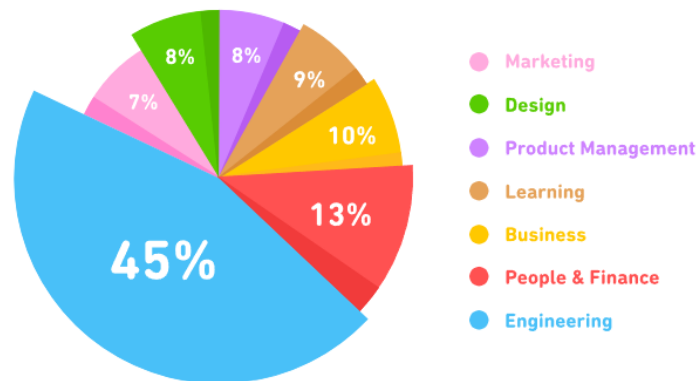


Molly Lindsay, (CPO)

Prior consultant at McKinsey & Company

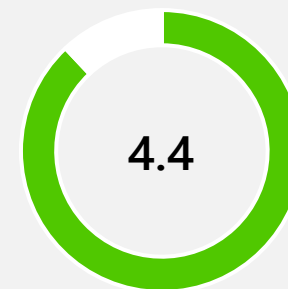
Strong Glassdoor reviews and diverse collaborative team...

- **89%** of employees would recommend working at Duolingo to a friend
- **96%** of employees have a positive outlook for the business
- **93%** approve of the CEO
- These ratings have remained stable over the past 12 months

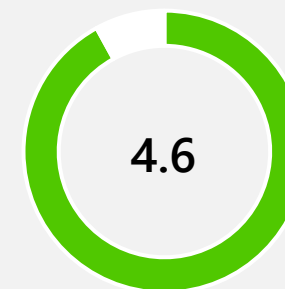


...supported with high ratings across three key areas

Work Life Balance



Culture



Career Opportunities



As a software company and education provider, Duolingo is granted an innately favourable ESG position.

Environmental

- Core offerings and operations of Duolingo taking place in the virtual space
- The introduction of AI capabilities has the potential to place a heavier strain on Duolingo's environmental impact.



- Duolingo neither imposes heavy destruction on the environment, nor takes on ready initiatives in environmental preservation.

Social

Advantages

- Language education is at the core of Duolingo



- Strong user-based community
- International Rescue Committee (IRC) Partnership

Disadvantages

- Blind spot in cultural education



- Removed many community functions, including the community forum in 2022

Governance

- As a blend of education and entertainment, Duolingo is not held to strict governance requirements, and has faced no major governance controversies.



duolingo



- With users of all ages, Duolingo takes care in displaying appropriate ads and language content.



Duolingo exerts an average ESG impact and faces minimal ESG risk.

Laggard

Average

Leader

Duolingo ESG industry rank based on Long-term Performance, Factset

Risk and Mitigation



Business risks and execution risks can threaten Duolingo's market share and growth opportunities within the next 5 years

	Risk	Likelihood	Severity	Mitigation
Execution Risks	Market volatility: Duolingo's market capitalization can move unfavourably in the short term thus impact our target price and projected growth rate			<ul style="list-style-type: none"> Market risks are often systematic TDM should constantly monitor financials during the holding period and re-evaluate exit opportunities within the remaining period of 2023
	Covid-19 lingers: Duolingo has already gained a substantial user base through its material success during the pandemic. Acquiring new users during further economic uncertainty is difficult.			<ul style="list-style-type: none"> Maintain financial flexibility by managing expenses prudently and having a contingency plan in place Although unlikely, TDM should monitor the effect of macro-economic events on the industry
Business Risks	Rising competitors: The saturated market has low barriers to entry and major technology companies pose notable risk as they are better equipped to take advantage of AI innovations.			<ul style="list-style-type: none"> Major technology companies have the potential to threaten Duolingo with its use of AI TDM should be aware of changing consumer patterns and assess Duolingo's strategies
	Monetisation challenges: Adjusting pricing strategy to improve conversion rate from free users to paid subscribers with its current freemium model may impact user retention and growth			<ul style="list-style-type: none"> Duolingo may consider offering tiered pricing options to tailor marketing efforts to user segments TDM should constantly monitor financials to ensure price optimization achieves a sustainable growth

Investment Recommendation



Duolingo is currently at an unattractive long position with an overvalued price and growth will eventually hit a wall

\$148.92

Current Price
on 2 Sep 2023

\$94.89

Target Price
Base case

Thesis

Valuation

Risks

Hold

Challenges to Grow

Growth opportunities are difficult to navigate due to overconfident market delusion driven by AI, unsustainable business model and macroeconomic headwinds

Overvalued

Share price is overvalued with a downside of 36.3% based on a blended analysis

Potential LT Risks

Significant capital investment is required to mitigate long-term risks arising from exposure to AI advancement

Investment Decision

Despite a positive 4-year exit IRR of 22.8%, Duolingo is overvalued trading at an unjustifiably rich level, failing to justify its earnings outlook.



Appendix

Appendix

Main Deck

1. [Title Slide](#)
2. [Business Interface](#)
3. [Executive Summary](#)
4. [Business Overview](#)
5. [Industry Overview](#)
6. [Investment Thesis 1](#)
7. [Investment Thesis 2](#)
8. [Investment Thesis 3](#)
9. [Valuation](#)
10. [Management, People, and Culture](#)
11. [ESG Analysis](#)
12. [Risk and Mitigation](#)
13. [Investment Recommendation](#)

Appendix A *Financials*

16. [Revenue Build Summary](#)
17. [Revenue Build: Subscriber Count Model](#)
18. [Revenue Build: Retention & Conversion Model](#)
19. [Revenue Build: Advertising, DET & Other Segment](#)
20. [Financial Statement Drivers](#)
21. [Income Statement](#)
22. [Balance Sheet](#)
23. [Cash Flow Statement](#)
24. [Operating Schedules](#)
25. [DCF Base Case](#)
26. [DCF Upside Case](#)
27. [DCF Downside Case](#)
28. [Quarterly Data](#)
29. [Comparables Operating Statistics](#)
30. [Comparables Calculations & Output](#)
31. [WACC](#)
32. [Beta Calculation](#)
33. [Adjusted EBITDA](#)
34. [Blended Valuation](#)
35. [Key Metric & IRR Calculation](#)
36. [Exit EBITDA Multiple Justification](#)

Appendix B *General*

37. [Insider Trading Volume](#)
38. [Insider Buying and Selling By Quarter](#)
39. [M&A Activity](#)
40. [Management Past Experiences](#)
41. [Technology Competitors](#)
42. [Google PaLM 2 Example Application](#)
43. [AI Hype](#)
44. [Analyst Price Targets](#)
45. [Porter's Five Forces](#)
46. [Market Share](#)
47. [Impact of Covid on Industry](#)
48. [Possible Tailwinds for Duolingo](#)
49. [ARM IPO Case Study](#)
50. [Revenue Estimates](#)
51. [Duolingo Annotated Share Price Chart](#)

Revenue Build: Summary



APPENDIX

Revenue Assumptions:	Unit	Historical:					Projected:					
		FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	
Revenue Summary												
Revenue by Segment:												
Subscription	\$m		55	118	181	274	400	514	661	809	900	
Advertising	\$m		14	27	39	45	64	82	106	129	135	
Duolingo English Test	\$m		1	15	25	33	51	66	85	104	116	
Other	\$m		1	2	7	19	14	18	23	28	31	
Total Revenue	\$m		71	162	251	369	530	680	874	1,069	1,182	
YoY Growth	%			128.5%	55.1%	47.3%	43.3%	28.3%	28.6%	22.4%	10.5%	
Subscription Segment												
Digital Language Learning Industry Size	m		890	1,310	1,760	3,147	3,640	4,222	4,898	5,682	6,591	7,645
Industry Growth	%			47%	34%	79%	16%	16%	16%	16%	16%	16%
Upside							19%	19%	19%	19%	19%	
Base							16%	16%	16%	16%	16%	
Downside							14%	14%	14%	14%	14%	
MAU	m		23	27	37	42	61	79	92	105	119	130
YoY Growth	%			17%	34%	16%	43%	31%	16%	14%	13%	10%
MAU as a % of Industry Size	%		2.62%	2.08%	2.09%	1.35%	1.67%	1.88%	1.88%	1.85%	1.80%	1.70%
Upside									1.95%	1.90%	1.80%	
Base									1.85%	1.80%	1.70%	
Downside									1.75%	1.70%	1.60%	
Average Subscription Fee	\$			61	73	72	65	65	65	70	75	75
Subscription Revenue	\$m			55	118	181	274	400	514	661	809	900
YoY Growth	%				114%	54%	51%	46%	28%	29%	22%	11%

Revenue Build: Subscriber Count Model



Subscriber Count Model

Subscriber Count	\$m	0.9	1.6	2.5	4.2	6.16	7.91	9.44	10.78	12.00
YoY Growth	%		78%	56%	68%	47%	28%	19%	14%	11%
% of MAU	%	3.30%	4.36%	5.90%	6.92%	7.76%	8.58%	8.98%	9.09%	9.24%
% of Subscribers on 1-Month Plan	%	31%	19%	19%	19%	20%	19%	19%	19%	19%
% of Subscribers on 12-Month Plan	%	57%	71%	71%	71%	70%	71%	71%	71%	71%
% of Subscribers on 6-Month Plan	%	12%	10%	10%	10%	10%	10%	10%	10%	10%
Subscribers on 1-Month Plan	m	0.28	0.30	0.48	0.80	1.23	1.54	1.80	2.04	2.28
Subscribers on 12-Month Plan	m	0.51	1.14	1.78	2.98	4.32	5.58	6.70	7.67	8.52
Subscribers on 6-Month Plan	m	0.11	0.16	0.25	0.42	0.62	0.79	0.94	1.08	1.20

Retention Rate:

1-Month Plan	%	9%	9%	9%	9%	9%	9%	9%	8%	7%	7%
Upside						11.500%	11.500%	10.500%	9.500%	9.500%	
Base						9%	9%	8%	7%	7%	
Downside						7.500%	7.500%	6.500%	5.500%	5.500%	
12-Month Plan	%	40%	40%	40%	40%	40%	40%	40%	38%	35%	35%
Upside						45.00%	45.00%	42.50%	40.00%	40.00%	
Base						40%	40%	38%	35%	35%	
Downside						37.50%	37.50%	35.00%	32.50%	32.50%	

Revenue Build: Retention & Conversion Model

Retention & Conversion Model:

Model assumes start year of 2019 (based on available data) and % subscribers on 6-Month plan stays constant at 10%

	2019	2020	2021	2022	2023	2024	2025	2026	2027
2019									
1-Month	0.28	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12-Month	0.51	0.21	0.08	0.03	0.01	0.01	0.00	0.00	0.00
2020									
1-Month		0.28	0.03	0.00	0.00	0.00	0.00	0.00	0.00
12-Month		0.93	0.37	0.15	0.06	0.02	0.01	0.00	0.00
2021									
1-Month			0.45	0.04	0.00	0.00	0.00	0.00	0.00
12-Month			1.32	0.53	0.21	0.08	0.03	0.01	0.01
2022									
1-Month				0.76	0.07	0.01	0.00	0.00	0.00
12-Month				2.27	0.91	0.36	0.15	0.06	0.02
2023									
1-Month					1.15	0.10	0.01	0.00	0.00
12-Month					3.13	1.25	0.50	0.20	0.08
2024									
1-Month						1.43	0.13	0.01	0.00
12-Month						3.85	1.54	0.62	0.25
2025									
1-Month							1.66	0.13	0.01
12-Month							4.47	1.68	0.63
2026									
1-Month								1.89	0.13
12-Month								5.10	1.78
2027									
1-Month									2.14
12-Month									5.75

Conversion Analysis (2019-22):

	2019	2020	2021	2022	2023	2024	2025	2026	2027
Additional 1-Month Subs as a % of Previous Year MAU		1.02%	1.22%	1.78%	1.90%	1.80%	1.80%	1.80%	1.80%
Upside					2.15%	2.05%	2.05%	2.05%	2.05%
Base					1.90%	1.80%	1.80%	1.80%	1.80%
Downside					1.65%	1.55%	1.55%	1.55%	1.55%
Additional 12-Month Subs as a % of MAU		3.41%	3.60%	5.36%	5.15%	4.85%	4.85%	4.85%	4.85%
Upside					5.65%	7.35%	7.35%	7.35%	7.35%
Base					5.15%	4.85%	4.85%	4.85%	4.85%
Downside					4.65%	4.35%	4.35%	4.35%	4.35%
Total Subscriber Penetration as a % of MAU		4.43%	4.82%	7.14%	7.05%	6.65%	6.65%	6.65%	6.65%

Revenue Build: Advertising, DET & Other Segment



Advertising Segment

Advertising Revenue	\$m	14	27	39	45	64	82	106	129	135
% of Subscription Revenue	%	26%	23%	21%	16%	16%	16%	16%	16%	15%

DET Segment

DET Revenue	\$m	1	15	25	33	51	66	85	104	116
% of Subscription Revenue	%	2%	13%	14%	12%	13%	13%	13%	13%	13%

Other Segment

Other Revenue	\$m	1	2	7	19	14	18	23	28	31
% of Subscription Revenue	%	1%	2%	4%	7%	3%	3%	3%	3%	3%

Financial Statement Drivers



Financial Statement Drivers	Unit	Historical:					Projected:				
		FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27
Assumptions:											
Income Statement Drivers											
Cost of Sales											
COGS as a % of Revenue	%		28.4%	27.4%	26.8%	26.7%	27.3%	27.3%	27.3%	27.3%	27.3%
Operating Expenses											
R&D as a % of Revenue	%		44.6%	32.8%	41.4%	40.3%	30.0%	25.0%	25.0%	20.0%	20.0%
Other SG&A as a % of Revenue	%		43.4%	48.2%	53.1%	49.2%	40.0%	35.0%	35.0%	30.0%	25.0%
Depreciation & CapEx											
D&A as a % of last year's NPPE & Intangibles	%			14.5%	16.2%	11.8%	14.2%	14.2%	14.2%	14.2%	14.2%
CapEx as a % of last year's Revenue	%			5.7%	3.8%	4.0%	3.0%	3.0%	3.0%	3.0%	3.0%
Other											
Nonoperating Income as a % of Adjusted EBIT	%		-6.2%	22.1%	-1.3%	62.0%					
Unusual Expense as a % of Adjusted EBIT	%		-13.3%	20.5%	-103.1%	6.0%					
Balance Sheet Drivers											
Assets											
Short-Term Receivables as a % of Revenue	%		23.9%	21.0%	22.9%	22.1%	22.5%	22.5%	22.5%	22.5%	22.5%
Other Current Assets as a % of Revenue	%		3.0%	2.4%	3.2%	2.0%	2.6%	2.6%	2.6%	2.6%	2.6%
Liabilities											
Short-Term Debt as a % of last year's Total Liabilities	%			2.7%	4.5%	3.3%	3.5%	3.5%	3.5%	3.5%	3.5%
Accounts Payable as a % of COGS	%		19.0%	5.0%	11.6%	1.2%	9.2%	9.2%	9.2%	9.2%	9.2%
Other Current Liabilities as a % of Revenue	%		38.6%	38.5%	43.0%	47.3%	41.9%	41.9%	41.9%	41.9%	41.9%

Income Statement



Financial Statement Drivers	Unit	Historical:					Projected:				
		FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27
Income Statement											
Revenue:											
Subscription	\$m		55	118	181	274	400	514	661	809	900
Advertising	\$m		14	27	39	45	64	82	106	129	135
Duolingo English Test	\$m		1	15	25	33	51	66	85	104	116
Other	\$m		1	2	7	19	14	18	23	28	31
Total Revenue	\$m		71	162	251	369	530	680	874	1,069	1,182
% Growth	%			128.5%	55.1%	47.3%	43.3%	28.3%	28.6%	22.4%	10.5%
COGS excluding D&A											
COGS excluding D&A	\$m		20.11	44.28	67.15	98.56	144.64	185.62	238.64	292.07	322.74
Depreciation & Amortization Expense	\$m		1.25	2.26	2.73	4.87	6.81	7.41	8.61	10.28	12.54
Gross Income	\$m		49.40	115.16	180.89	266.06	378.13	486.57	626.48	767.01	846.36
SG&A Expense:											
R&D	\$m		31.56	53.02	103.79	148.94	158.87	169.90	218.43	213.87	236.33
Other SG&A	\$m		30.74	77.87	133.20	181.68	211.83	237.86	305.81	320.81	295.41
Total SG&A Expense	\$m		62.30	130.89	236.99	330.62	370.70	407.76	524.24	534.68	531.74
EBIT (Operating Income)	\$m		-12.90	-15.73	-56.10	-64.56	7.42	78.81	102.24	232.33	314.62
% EBIT Margin	%		-18.2%	-9.7%	-22.4%	-17.5%	1.4%	11.6%	11.7%	21.7%	26.6%
Adjusted EBIT (Operating Income)	\$m		-9.22	1.37	-3.79	10.59	68.09				
% Adjusted EBIT Margin	%		-13.0%	0.8%	-1.5%	2.9%	12.9%				
Nonoperating Income - Net											
Nonoperating Income - Net	\$m		0.57	0.30	0.05	6.56	1.87	1.87	1.87	1.87	1.87
Unusual Expense - Net											
Unusual Expense - Net	\$m		1.23	0.28	3.91	0.64	1.51	1.51	1.51	1.51	1.51
Pretax Income	\$m		-13.55	-15.71	-59.96	-58.64	7.78	79.17	102.60	232.68	314.98
Adjusted Pretax Income	\$m		-9.88	1.40	-7.65	16.51	68.45				
Income Taxes	\$m		0.00	0.07	0.18	0.94	0.30	0.37	0.45	0.51	0.41
Consolidated Net Income	\$m		-13.55	-15.78	-60.14	-59.57	7.49	78.80	102.15	232.17	314.57
Adjusted Consolidated Net Income	\$m		-9.88	1.33	-7.83	15.57	68.16				
Net Income	\$m		-13.55	-15.78	-60.14	-59.57	7.49	78.80	102.15	232.17	314.57
Adjusted Net Income	\$m		-9.88	1.33	-7.83	15.57	68.16				
EBITDA											
EBITDA	\$m		-11.65	-13.47	-53.37	-59.69	14.23	86.22	110.85	242.61	327.16
% EBITDA Margin	%		-16.5%	-8.3%	-21.3%	-16.2%	2.7%	12.7%	12.7%	22.7%	27.7%
Adjusted EBITDA											
Adjusted EBITDA	\$m		-7.97	3.63	-1.07	15.46	74.9				
% Adjusted EBITDA Margin	%		-11.3%	2.2%	-0.4%	4.2%	14.1%				

Balance Sheet



APPENDIX

Financial Statements	Unit	Historical:					Projected:				
		FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27
Balance Sheet											
Assets:											
Cash & Short-Term Investments	\$m		59.84	120.49	553.92	608.18	748.05	967.35	1,242.60	1,649.01	2,081.15
Short-Term Receivables	\$m		16.94	34.04	57.38	81.77	119.15	152.91	196.58	240.60	265.86
Other Current Assets	\$m		2.14	3.86	7.97	7.23	13.96	17.92	23.04	28.20	31.16
Total Current Assets	\$m		78.92	158.38	619.27	697.18	881.16	1,138.18	1,462.22	1,917.80	2,378.16
Net Property, Plant & Equipment	\$m		13.82	14.50	36.58	35.48	38.64	44.90	53.60	65.37	79.80
Intangible Assets	\$m		1.79	2.30	4.57	12.55	13.66	15.88	18.96	23.12	28.22
Deferred Tax Assets	\$m					10.25	0.00	0.00	0.00	0.00	0.00
Other Assets	\$m		0.52	0.56	0.89	1.51	0.87	0.87	0.87	0.87	0.87
Total Non-Current Assets	\$m		16.14	17.36	42.04	59.78	53.17	61.65	73.42	89.35	108.90
Total Assets	\$m		95.06	175.74	661.31	756.96	934.34	1,199.83	1,535.65	2,007.16	2,487.06
Liabilities & Shareholders' Equity											
ST Debt & Curr. Portion LT Debt	\$m		0.97	1.11	3.34	4.90	7.53	9.66	12.40	15.92	19.73
Accounts Payable	\$m		3.81	2.20	7.82	1.18	13.29	17.05	21.93	26.83	29.65
Income Tax Payable	\$m		0.00	0.07	0.11	1.07	0.31	0.31	0.31	0.31	0.31
Other Current Liabilities	\$m		27.32	62.32	107.86	174.62	221.66	284.45	365.71	447.59	494.58
Total Current Liabilities	\$m		32.11	65.69	119.13	181.77	242.79	311.48	400.34	490.66	544.27
Long-Term Debt	\$m		9.24	8.13	29.12	23.50	32.94	42.32	54.08	72.24	92.55
Deferred Tax Liabilities	\$m					9.61	0.00	0.00	0.00	0.00	0.00
Total Non-Current Liabilities	\$m		9.24	8.13	29.12	33.12	32.94	42.32	54.08	72.24	92.55
Total Liabilities	\$m		41.35	73.82	148.26	214.88	275.73	353.80	454.42	562.90	636.82
Preferred Stock (Carrying Value)	\$m		137.69	182.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Common Equity	\$m		-83.98	-80.69	513.06	542.08	658.61	846.03	1,081.22	1,444.26	1,850.24
Shareholders' Equity	\$m		53.71	101.92	513.06	542.08	658.61	846.03	1,081.22	1,444.26	1,850.24
Total Liabilities & Shareholders' Equity	\$m		95.06	175.74	661.31	756.96	934.34	1,199.83	1,535.65	2,007.16	2,487.06
<i>BS Check</i>			TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE

Cash Flow Statement



Financial Statements	Unit	Historical:					Projected:				
		FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27
Cash Flow Statement											
Cash Flow from Operating Activities											
Net Income / Starting Line	\$m		-13.55	-15.78	-60.14	-59.57	7.49	78.80	102.15	232.17	314.57
Depreciation, Depletion & Amortization	\$m		1.25	2.26	2.73	4.87	6.81	7.41	8.61	10.28	12.54
Other Funds	\$m		4.95	17.03	40.80	73.82	34.15	42.69	49.09	53.39	56.06
YoY Growth	%			244%	140%	81%	40%	25%	15%	9%	5%
Funds from Operations	\$m		-7.35	3.51	-16.61	19.12	48.44	128.90	159.86	295.84	383.17
Changes in Working Capital	\$m		9.50	14.20	25.78	34.54	96.53	100.32	129.80	130.80	75.07
Net Operating Cash Flow	\$m		2.15	17.71	9.17	53.66	144.98	229.21	289.66	426.64	458.25
Cash Flow from Investing Activities											
Capital Expenditures	\$m		-5.25	-4.01	-6.21	-10.12	-11.08	-15.89	-20.39	-26.21	-32.08
Capital Expenditures (Fixed Assets)	\$m		-3.77	-3.38	-3.59	-5.56					
Capital Expenditures (Other Assets)	\$m		-1.48	-0.64	-2.62	-4.56					
Net Assets from Acquisitions	\$m		0.00	0.00	0.00	-4.05	0.00	0.00	0.00	0.00	0.00
Purchase/Sale of Investments	\$m		7.68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Funds	\$m		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Investing Cash Flow	\$m		2.43	-4.01	-6.21	-14.17	-11.08	-15.89	-20.39	-26.21	-32.08
Cash Flow from Financing Activities											
Change in Capital Stock	\$m		1.12	2.03	430.47	14.78	5.98	5.98	5.98	5.98	5.98
Other Funds	\$m		29.85	44.92	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Financing Cash Flow	\$m		30.97	46.95	430.47	14.78	5.98	5.98	5.98	5.98	5.98
Net Change in Cash	\$m		35.55	60.65	433.43	54.26	139.87	219.30	275.25	406.41	432.14
Beginning Cash	\$m		24.29	59.84	120.49	553.92	608.18	748.05	967.35	1,242.60	1,649.01
Ending Cash	\$m		59.84	120.49	553.92	608.18	748.05	967.35	1,242.60	1,649.01	2,081.15
Free Cash Flow	\$m		-3.09	13.69	2.96	43.53	133.89	213.33	269.27	400.43	426.16

Operating Schedules



APPENDIX

CapEx and Depreciation Schedule	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27
Opening Net PPE & Intangibles		15.61	16.80	41.15	48.02	52.30	60.78	72.55	88.48
CapEx	5.25	4.01	6.21	10.12	11.08	15.89	20.39	26.21	32.08
D&A Expense	1.25	2.26	2.73	4.87	6.81	7.41	8.61	10.28	12.54
Other	-	-0.57	20.87	1.62	-	-	-	-	-
Closing Net PPE & Intangibles	15.61	16.80	41.15	48.02	52.30	60.78	72.55	88.48	108.02
Closing Net PPE	13.82	14.50	36.58	35.48	38.64	44.90	53.60	65.37	79.80
Closing Intangibles	1.79	2.30	4.57	12.55	13.66	15.88	18.96	23.12	28.22
Closing Net PPE & Intangibles	15.61	16.80	41.15	48.02	52.30	60.78	72.55	88.48	108.02

Balance Sheet Financing	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27
Total Assets	95.06	175.74	661.31	756.96	934.34	1,199.83	1,535.65	2,007.16	2,487.06
Total Current Liabilities	32.11	65.69	119.13	181.77	242.79	311.48	400.34	490.66	544.27
Total LT Liabilities excl. LT Debt	0.00	0.00	0.00	9.61	0.00	0.00	0.00	0.00	0.00
Total External Financing Required	62.95	110.05	542.18	565.58	691.55	888.35	1,135.30	1,516.50	1,942.79

Financing D/E	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27
Total External LT Financing	62.95	110.05	542.18	565.58	691.55	888.35	1,135.30	1,516.50	1,942.79
LT Debt	9.24	8.13	29.12	23.50	32.94	42.32	54.08	72.24	92.55
Common Equity	-83.98	-80.69	513.06	542.08	658.61	846.03	1081.22	1444.26	1850.24
D/E Ratio			0.06	0.04	0.05	0.05	0.05	0.05	0.05
LT Debt / Total External Financing	14.7%	7.4%	5.4%	4.2%	4.8%	4.8%	4.8%	4.8%	4.8%
Common Equity / Total External Financing			94.6%	95.8%	95.2%	95.2%	95.2%	95.2%	95.2%

Net Working Capital Schedule	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27
Total Current Assets (less cash)	19.08	37.89	65.35	89.00	133.11	170.83	219.62	268.80	297.02
Total Current Liabilities	32.11	65.69	119.13	181.77	242.79	311.48	400.34	490.66	544.27
Net Working Capital	-13.03	-27.80	-53.78	-92.76	-109.67	-140.65	-180.72	-221.86	-247.25
Change in Net Working Capital		-14.77	-25.98	-38.98	-16.91	-30.98	-40.06	-41.14	-25.39

DCF Base Case



Input & Output

Current Share Price	\$148.92
Diluted Shares Outstanding	49
Implied Tax Rate	21%
Discount Rate (WACC)	10.96%
Terminal Growth Rate (TGR)	3%

Terminal Value - Perpetuity Growth Method	
Expected Long-Term GDP Growth	3%
Baseline Terminal FCF Growth Rate	2.0%
Baseline Terminal Value	2,895.55
PV of Terminal Value	1,721.34
PV of UFCFs	\$454.28
Implied Enterprise Value	2,175.62
Net Debt	-579.8
Implied Equity Value	2,755.42
Diluted Shares Outstanding	49
Implied Share Price from DCF	56.44
Premium / (Discount) to Current	-62%

Terminal Value - Multiples Method	
Expected Long-Term GDP Growth	3%
Terminal EBITDA Multiple	24.85
Baseline Terminal Value	8129.97108
PV of Terminal Value	4833.08698
PV of UFCFs	454.28
	5287.36268
Net Debt	-579.8
Implied Equity Value	5,867.16
Diluted Shares Outstanding	49
Implied Share Price from DCF	120.18
Premium / (Discount) to Current	-19%

Unlevered Free Cash Flow	Unit						Projected:				
		FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	
EBIT (Operating Income)	\$m	-12.90	-15.73	-56.10	-64.56	7.42	78.81	102.24	232.33	314.62	
Implied Tax	\$m	-2.71	-3.30	-11.78	-13.56	1.56	16.55	21.47	48.79	66.07	
NOPAT	\$m	-10.19	-12.43	-44.32	-51.00	5.87	62.26	80.77	183.54	248.55	
Depreciation & Amortization Expense	\$m	1.25	2.26	2.73	4.87	6.81	7.41	8.61	10.28	12.54	
Capital Expenditures	\$m	5.25	4.01	6.21	10.12	11.08	15.89	20.39	26.21	32.08	
Change in Net Working Capital	\$m		-14.77	-25.98	-38.98	-16.91	-30.98	-40.06	-41.14	-25.39	
Unlevered Free Cash Flow	\$m		0.59	-21.82	-17.27	18.50	84.77	109.06	208.75	254.40	
Discounted FCFF	\$m					16.67	68.85	79.83	137.70	151.24	

DCF Upside Case



Input & Output

Current Share Price	\$148.92
Diluted Shares Outstanding	49
Implied Tax Rate	21%
Discount Rate (WACC)	10.96%
Terminal Growth Rate (TGR)	3%

Terminal Value - Perpetuity Growth Method	
Expected Long-Term GDP Growth	3%
Baseline Terminal FCF Growth Rate	2.0%
Baseline Terminal Value	5,187.57
PV of Terminal Value	3,083.90
PV of UFCFs	\$788.41
Implied Enterprise Value	3,872.31
Net Debt	-579.8
Implied Equity Value	4,452.11
Diluted Shares Outstanding	49
Implied Share Price from DCF	91.19
Premium / (Discount) to Current	-39%

Terminal Value - Multiples Method	
Expected Long-Term GDP Growth	3%
Terminal EBITDA Multiple	24.85
Baseline Terminal Value	13900.7995
PV of Terminal Value	8263.71614
PV of UFCFs	788.41
Implied Enterprise Value	9052.12413
Net Debt	-579.8
Implied Equity Value	9,631.92
Diluted Shares Outstanding	49
Implied Share Price from DCF	197.29
Premium / (Discount) to Current	32%

Unlevered Free Cash Flow	Unit	FY19	FY20	FY21	FY22	1	2	3	4	5
						FY23	FY24	Projected:		
EBIT (Operating Income)	\$m	-12.90	-15.73	-56.10	-64.56	8.59	109.37	152.67	382.90	544.14
Implied Tax	\$m	-2.71	-3.30	-11.78	-13.56	1.80	22.97	32.06	80.41	114.27
NOPAT	\$m	-10.19	-12.43	-44.32	-51.00	6.79	86.40	120.61	302.49	429.87
Depreciation & Amortization Expense	\$m	1.25	2.26	2.73	4.87	6.81	7.41	8.80	11.46	15.25
Capital Expenditures	\$m	5.25	4.01	6.21	10.12	11.08	17.19	27.61	38.18	52.15
Change in Net Working Capital	\$m		-14.77	-25.98	-38.98	-25.27	-69.64	-73.78	-95.82	-62.81
Unlevered Free Cash Flow	\$m		0.59	-21.82	-17.27	27.78	146.26	175.57	371.59	455.78
Discounted FCFF	\$m					25.04	118.79	128.51	245.12	270.95

DCF Downside Case



Input & Output

Current Share Price	\$148.92
Diluted Shares Outstanding	49
Implied Tax Rate	21%
Discount Rate (WACC)	10.96%
Terminal Growth Rate (TGR)	3%

Terminal Value - Perpetuity Growth Method	
Expected Long-Term GDP Growth	3%
Baseline Terminal FCF Growth Rate	2.0%
Baseline Terminal Value	2,106.89
PV of Terminal Value	1,252.50
PV of UFCFs	\$343.88
Implied Enterprise Value	1,596.38
Net Debt	-579.8
Implied Equity Value	2,176.18
Diluted Shares Outstanding	49
Implied Share Price from DCF	44.58
Premium / (Discount) to Current	-70%

Terminal Value - Multiples Method	
Expected Long-Term GDP Growth	3%
Terminal EBITDA Multiple	24.85
Baseline Terminal Value	6186.85857
PV of Terminal Value	3677.94982
PV of UFCFs	343.88
	4021.8297
Net Debt	-579.8
Implied Equity Value	4,601.63
Diluted Shares Outstanding	49
Implied Share Price from DCF	94.26
Premium / (Discount) to Current	-37%

Unlevered Free Cash Flow	Unit						Projected:				
		FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	
EBIT (Operating Income)	\$m	-12.90	-15.73	-56.10	-64.56	6.26	68.92	88.34	182.95	237.32	
Implied Tax	\$m	-2.71	-3.30	-11.78	-13.56	1.31	14.47	18.55	38.42	49.84	
NOPAT	\$m	-10.19	-12.43	-44.32	-51.00	4.94	54.45	69.79	144.53	187.48	
Depreciation & Amortization Expense	\$m	1.25	2.26	2.73	4.87	6.81	7.41	8.43	9.79	11.65	
Capital Expenditures	\$m	5.25	4.01	6.21	10.12	11.08	14.58	18.05	22.88	25.49	
Change in Net Working Capital	\$m		-14.77	-25.98	-38.98	-8.55	-23.65	-33.10	-19.64	-11.47	
Unlevered Free Cash Flow	\$m		0.59	-21.82	-17.27	9.21	70.93	93.27	151.08	185.11	
Discounted FCFF	\$m					8.30	57.60	68.27	99.66	110.04	

Quarterly Data (Supplemental for Sanity Check)

Product Segments (\$m)

	Mar '21 Q1	Jun '21 Q2	Sep '21 Q3	Dec '21 Q4	Mar '22 Q1	Jun '22 Q2	Sep '22 Q3	Dec '22 Q4	Mar '23 Q1	Jun '23 Q2	Sep '23E Q3	Dec '23E Q4	Mar '24E Q1	Jun '24E Q2	Sep '24E Q3	Dec '24E Q4
Subscription	40	44	46	51	58	65	72	78	86	95	101	108	117	122	127	133
Advertising					12	11	11	11	12	13	11	13	13	14	13	14
Duolingo English Test	66	65	73	91	102	97	103	126	140	138	136	158	175	169	169	194
Other			18	21	24	23	24	26	30	31	31	31	37	39	38	38

Operating Metrics

	Mar '21 Q1	Jun '21 Q2	Sep '21 Q3	Dec '21 Q4	Mar '22 Q1	Jun '22 Q2	Sep '22 Q3	Dec '22 Q4	Mar '23 Q1	Jun '23 Q2	Sep '23E Q3	Dec '23E Q4	Mar '24E Q1	Jun '24E Q2	Sep '24E Q3	Dec '24E Q4
Monthly Active Users	40	38	42	42	49	50	57	61	73	74	78	79	90	91	93	92
Daily Active Users	10	9	10	10	13	13	15	16	20	21	22	23	26	27	28	28
Paid Subscribers	1.80	1.92	2.18	2.51	2.91	3.30	3.68	4.21	4.80	5.20	5.60	5.90	6.39	6.82	7.24	7.56

2023 MAU Q4 79
2024 MAU Q4 92

Comparables Operating Statistics



APPENDIX

Company Name	Ticker	Share Price	Share Count	Equity Value	Enterprise Value	Revenue		EBITDA		Net Income	
						FY 22	FY 23	FY 22	FY 23	FY 22	FY 23
Chegg Inc	CHGG	10	127	1,290	1,558	767	709	255	215	194	146
Stride Inc	LRN	44	43	1,911	1,910	1,687	1,837	273	296	107	127
2U Inc	TWOU	3	90	290	1,085	963	979	963	979	-322	-230
Coursera Inc	COUR	17	181	3,158	2,440	524	621	-37	-21	-53	-18
Pearson PLC	PSO	11	716	7,592	8,333	4,731	4,686	859	1,021	458	506
Maximum						4,731	4,686	963	1,021	458	506
75th Percentile						1,687	1,837	859	979	194	146
Median						963	979	273	296	107	127
25th Percentile						767	709	255	215	-53	-18
Minimum						524	621	-37	-21	-322	-230
Duolingo	DUOL	149	49	7,270	6,592	370	424	15	75	4.66	60.16

Valuation/Multiples

Company Name	Ticker	Share Price	Share Count	Equity Value	Enterprise Value	EV/Revenue		EV/EBITDA		P/E	
						FY 22	FY 23	FY 22	FY 23	FY 22	FY 23
Chegg Inc	CHGG	10.19	126.57	1,289.75	1,557.90	2.0x	2.2x	6.1x	7.2x	6.6x	8.9x
Stride Inc	LRN	44.09	43.34	1,910.86	1,910.00	1.1x	1.0x	7.0x	6.5x	17.9x	15.0x
2U Inc	TWOU	3.22	89.96	289.67	1,084.60	1.1x	1.1x	1.1x	1.1x		
Coursera Inc	COUR	17.42	181.30	3,158.25	2,440.00	4.7x	3.9x				
Pearson PLC	PSO	10.60	716.20	7,591.72	8,333.00	1.8x	1.8x	9.7x	8.2x	16.6x	15.0x
Maximum						4.7x	3.9x	9.7x	8.2x	17.9x	15.0x
75th Percentile						2.0x	2.2x	7.7x	7.5x	17.2x	15.0x
Median						1.8x	1.8x	6.6x	6.8x	16.6x	15.0x
25th Percentile						1.1x	1.1x	4.9x	5.1x	11.6x	11.9x
Minimum						1.1x	1.0x	1.1x	1.1x	6.6x	8.9x
Duolingo	DUOL	149	49	7,270	6,592	17.8x	15.5x	426.5x	88.0x	1560.3x	120.8x

Comparables Calculations & Output



DUOL Adjusted EBITDA

	2021	2022
Net Loss	-60.14	-59.57
Interest Income	-0.02	-7.24
Provision for Income Taxes	0.18	0.94
Depreciation and Amortization	2.73	4.87
Stock-Based Compensation	42.46	75.82
IPO and Public Company Costs	3.91	0.34
Acquisition Transaction Costs	-	0.19
Acquisitions Earn-Out Costs	-	0.11
Tender Offer-Related Costs	5.60	-
Other Expenses	4.22	-
Adjusted EBITDA	-1.07	15.46

Financial Outlook Dec 31, 2023

	Full Year 2023	
	Low	High
Total Bookings	569	575
Revenues	520	526
Adjusted EBITDA	72.4	77.4
Adjusted EBITDA Margin	14%	15%

Source: Duolingo 10K, Q2 Earnings Result

EBITDA Exit Multiple Calculation

Industry	EBITDA Multiple	Weight
Software	30.92	10%
Commercial Education Services	23.88	40%
General Education Services	23.88	40%
Entertainment	26.54	10%
Exit EBITDA Multiple	24.85	100%

EV/Revenue 25th Percentile

Revenue	530
EV/Revenue Multiple	1.1x
Implied EV	586.8788304
Net Debt	-579.8
Implied Equity Value	1166.67883
Diluted Shares Outstanding	49
Implied Share Price	23.897559

EV/EBITDA 25th Percentile

EBITDA	75
EV/EBITDA Multiple	5.1x
Implied EV	383.2317085
Net Debt	-579.8
Implied Equity Value	963.0317085
Diluted Shares Outstanding	49
Implied Share Price	19.72617182

P/E 25th Percentile

Net Income	78.80
P/E Multiple	11.9x
Diluted Shares Outstanding	49
Implied Share Price	19.26

EV/Revenue 75th Percentile

Revenue	530
EV/Revenue Multiple	2.2x
Implied EV	1164.4696
Net Debt	-579.8
Implied Equity Value	1744.2696
Diluted Shares Outstanding	49
Implied Share Price	35.72858664

EV/EBITDA 75th Percentile

EBITDA	75
EV/EBITDA Multiple	7.5x
Implied EV	559.6835042
Net Debt	-579.8
Implied Equity Value	1139.483504
Diluted Shares Outstanding	49
Implied Share Price	23.34050603

P/E 75th Percentile

Net Income	78.80
P/E Multiple	15.0x
Diluted Shares Outstanding	49
Implied Share Price	24.22

EV/Revenue Median

Revenue	530
EV/Revenue Multiple	1.8x
Implied EV	941.7324379
Net Debt	-579.8
Implied Equity Value	1521.532438
Diluted Shares Outstanding	49
Implied Share Price	31.16617038

EV/EBITDA Median

EBITDA	75
EV/EBITDA Multiple	6.8x
Implied EV	512.8920007
Net Debt	-579.8
Implied Equity Value	1092.692001
Diluted Shares Outstanding	49
Implied Share Price	22.38205655

P/E Median

Net Income	78.80
P/E Multiple	15.0x
Diluted Shares Outstanding	49
Implied Share Price	24.22

WACC Analysis

Discount Rate

Cost of Equity	10.99%
Cost of Debt	5.47%
% Equity	99.61%
% Debt	0.39%
WACC	10.96%

Cost of Equity - CAPM Pricing Model

Risk Free Rate	4.19%
Market Risk Premium	5.82%
Beta	1.17

Risk Free Rate	Value	Weighting
10 Year US Government Bond	4.19%	100%

Market Risk Premium	Value	Weighting
Statistica	5.70%	50%
Damodaran	5.94%	50%
Implied Market Risk Premium	5.82%	

Beta	Value	Weighting
Factset Adjusted Beta (3Y)	1.09	40%
Linear Regression	1.22	60%
Beta	1.17	

Cost of Debt

Pre-Tax Cost of Debt	6.92%
Implied Tax Rate	21%
Post-Tax Cost of Debt	5.47%

Name	Ticker	Levered Beta	Debt	% Debt	Equity Value	% Equity	Tax Rate	Unlevered Beta
Duolingo	DUOL	1.55	28.41	0.39%	7,270.27	99.61%	21%	1.55

Beta Calculation



SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.4756784
R Square	0.2262699
Adjusted R Square	0.2231501
Standard Error	0.0331952
Observations	250

ANOVA

	df	SS	MS	F	Significance F
Regression	1	0.079917	0.079917	72.525221	1.608E-15
Residual	248	0.2732762	0.0011019		
Total	249	0.3531931			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	0.0015439	0.002103	0.7341336	0.4635608	-0.0025982	0.005686	-0.0025982	0.005686
X Variable 1	1.2211859	0.1433961	8.5161741	1.608E-15	0.9387565	1.5036153	0.9387565	1.5036153

Covariance Method:

Beta 1.2211859

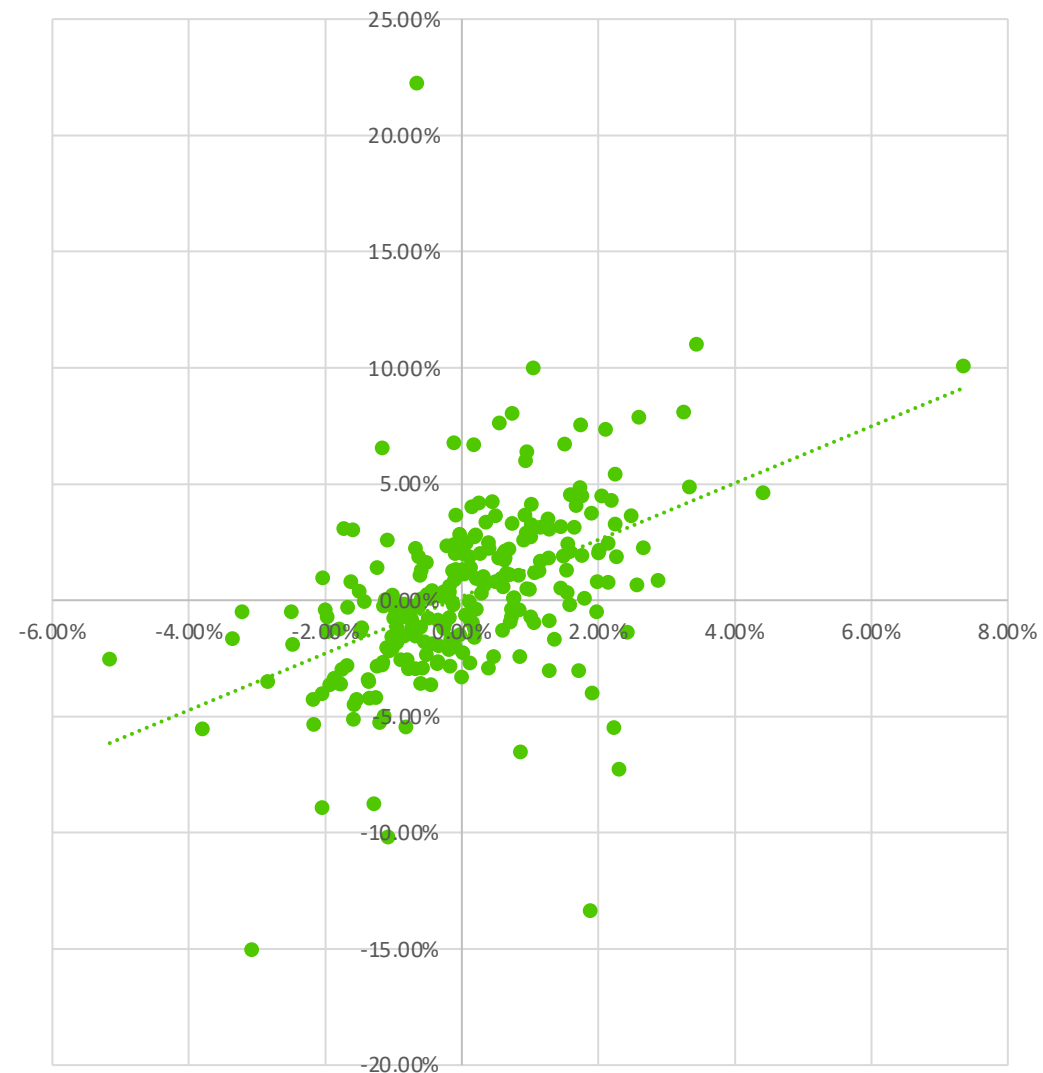
Average:

Beta 1.2211859

$$y = 1.2212x + 0.0015$$

$$R^2 = 0.2263$$

Scatter Plot



Adjusted EBITDA

Reconciliation: Adjusted EBITDA and Adjusted EBITDA Margin

Adjusted EBITDA is defined as net loss excluding interest (income) expense, net, income tax provision, depreciation and amortization, stock-based compensation expenses related to equity awards, Initial Public Offering ("IPO") and public company costs and transaction costs related to an acquisition, tender offer-related costs and other expenses. Adjusted EBITDA margin is defined as Adjusted EBITDA as a percentage of revenues. These non-GAAP financial measures are used by management to evaluate the financial performance of our business and we present these non-GAAP financial measures because we believe that they are helpful in highlighting trends in our operating results and that they are frequently used by analysts, investors and other interested parties to evaluate companies in our industry. The following table presents a reconciliation of our net loss, the most directly comparable financial measure presented in accordance with GAAP, to Adjusted EBITDA and Adjusted EBITDA margin.

(in thousands)	Q4 2021	Q4 2022	2021	2022
Net Income (Loss)	\$(17,517)	\$(13,930)	\$(60,135)	\$(59,574)
Less: Interest income	(12)	(4,273)	(19)	(7,235)
Plus: Provision for income taxes	108	716	177	938
Plus: Depreciation & amortization	757	1,444	2,726	4,870
Plus: Stock-based compensation expenses related to equity awards (1)	16,337	21,105	42,457	75,822
Plus: IPO and public company costs (2)	656	-	3,909	338
Plus: Acquisition transaction costs (3)	-	8	-	185
Plus: Acquisition earn-out costs (4)	-	113	-	113
Plus: Tender offer-related costs (5)	-	-	5,599	-
Plus: Other expenses (6)	-	-	4,220	-
Adjusted EBITDA	\$329	\$5,183	\$(1,066)	\$15,457
Revenues	\$73,014	\$103,824	\$250,772	\$369,495
Adjusted EBITDA margin	0.5%	5.0%	(0.4)%	4.2%

Blended Valuation

Valuation Method	Minimum	Difference	Maximum	Base Case
52-Week Trading Range	64.73	103.67	168.4	116.565
DCF	44.58	46.61	91.19	56.44
EV / EBITDA	19.72617182	3.614334201	23.34050603	22.38205655
EV / Revenue	23.897559	11.83102764	35.72858664	31.16617038
EV / EBITDA Exit	94.26	103.03	197.29	120.18
Price / Earnings	19.26	4.954379905	24.22	24.22
Broker Estimates	105.00	62	167.00	133.00

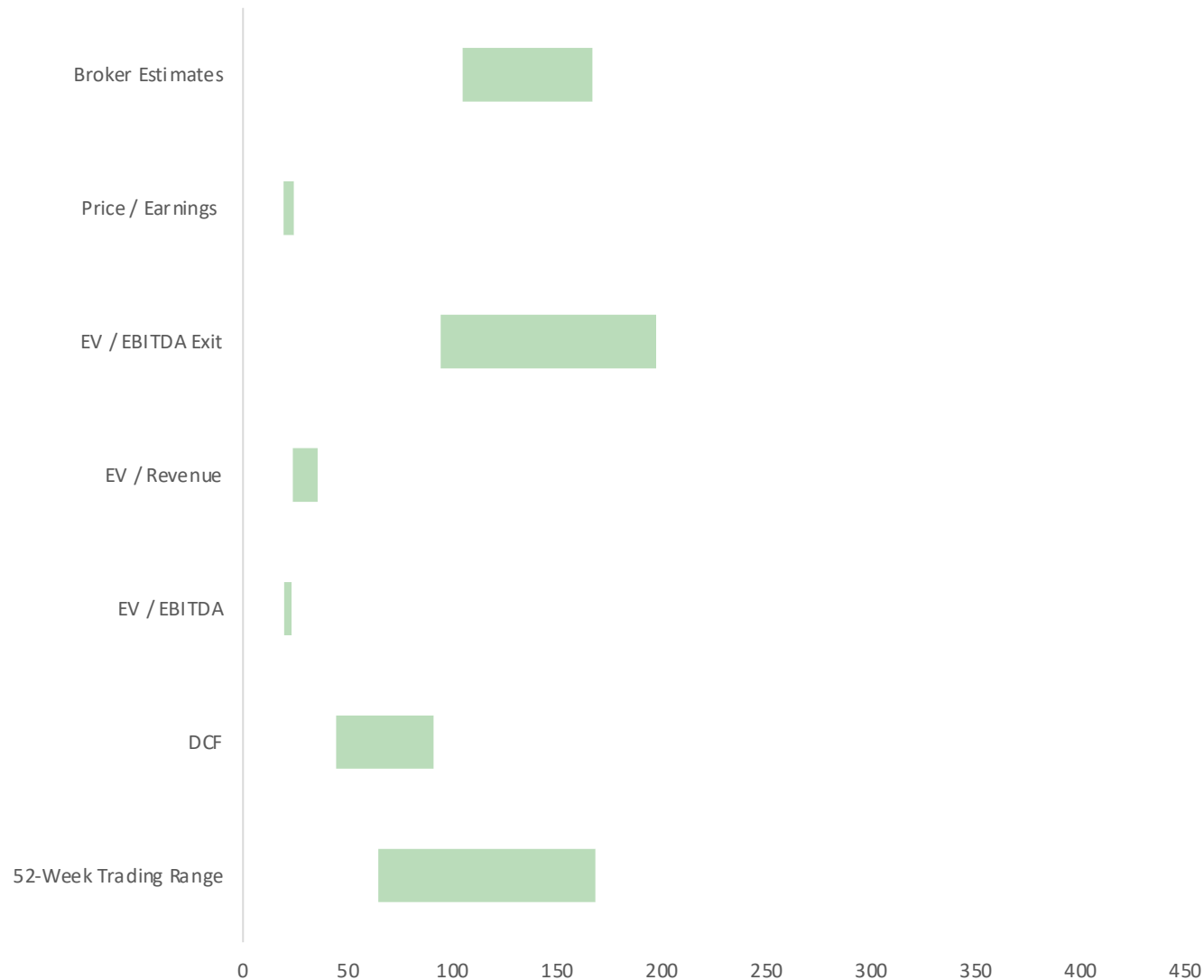
Blended Fair Value (DCF)	Share Price	Probability
Upside	91.19	15%
Base	56.44	70%
Downside	44.58	15%
Value	59.87	100%

Blended Fair Value (EBITDA Exit)	Share Price	Probability
Upside	197.29	15%
Base	120.18	70%
Downside	94.26	15%
Value	127.86	100%

Brokerage	Target Price
Needham & Company	160
Piper Sandler	167
Barclays	136
Bank of America	105
Goldman Sachs	109
Evercose ISI	130

Valuation Method	Weight
52-Week Trading Range	0%
DCF	50%
EV / EBITDA (exit multiple)	30%
EV / Revenue	0%
Price / Earnings	0%
Broker Estimates	20%
Current Price	148.92
Target Price	94.89
Premium / (Discount)	-36.28%

Football Field Valuation



Key Metrics & IRR Calculation



APPENDIX

Key Metrics & IRR	Unit						Projected:				
		FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	
Revenue Growth	\$m		129%	55%	47%	43%	28%	29%	22%	10%	
EBITDA	\$m	-11.65	-13.47	-53.37	-59.69	14.23	86.22	110.85	242.61	327.16	
Margin	%	-16%	-8%	-21%	-16%	3%	13%	13%	23%	28%	
Adjusted EBITDA	\$m			-1.07	15.46	74.90					
Margin	%				4%	14%					
Enterprise Value	\$m			3,539.58	2,291.10	6,592.00	6,726.24	6,096.84	8,491.25	8,129.97	
(+) Cash	\$m			553.92	608.18	748.05	967.35	1,242.60	1,649.01	2,081.15	
(-) Debt	\$m			32.46	28.41	40.47	51.98	66.48	88.16	112.27	
Equity Value	\$m			4,061.04	2,870.87	7,299.57	7,641.61	7,272.96	10,052.09	10,098.84	
EBITDA Multiple					148.22	88.01	78.01	55.00	35.00	24.85	
Net Cash Flows	\$m				-2,870.87	18.50	84.77	109.06	208.75	254.40	
Terminal Value	\$m								6028.78708		
Total	\$m				-2,870.87	18.50	84.77	109.06	6,237.54		

IRR 22.8%

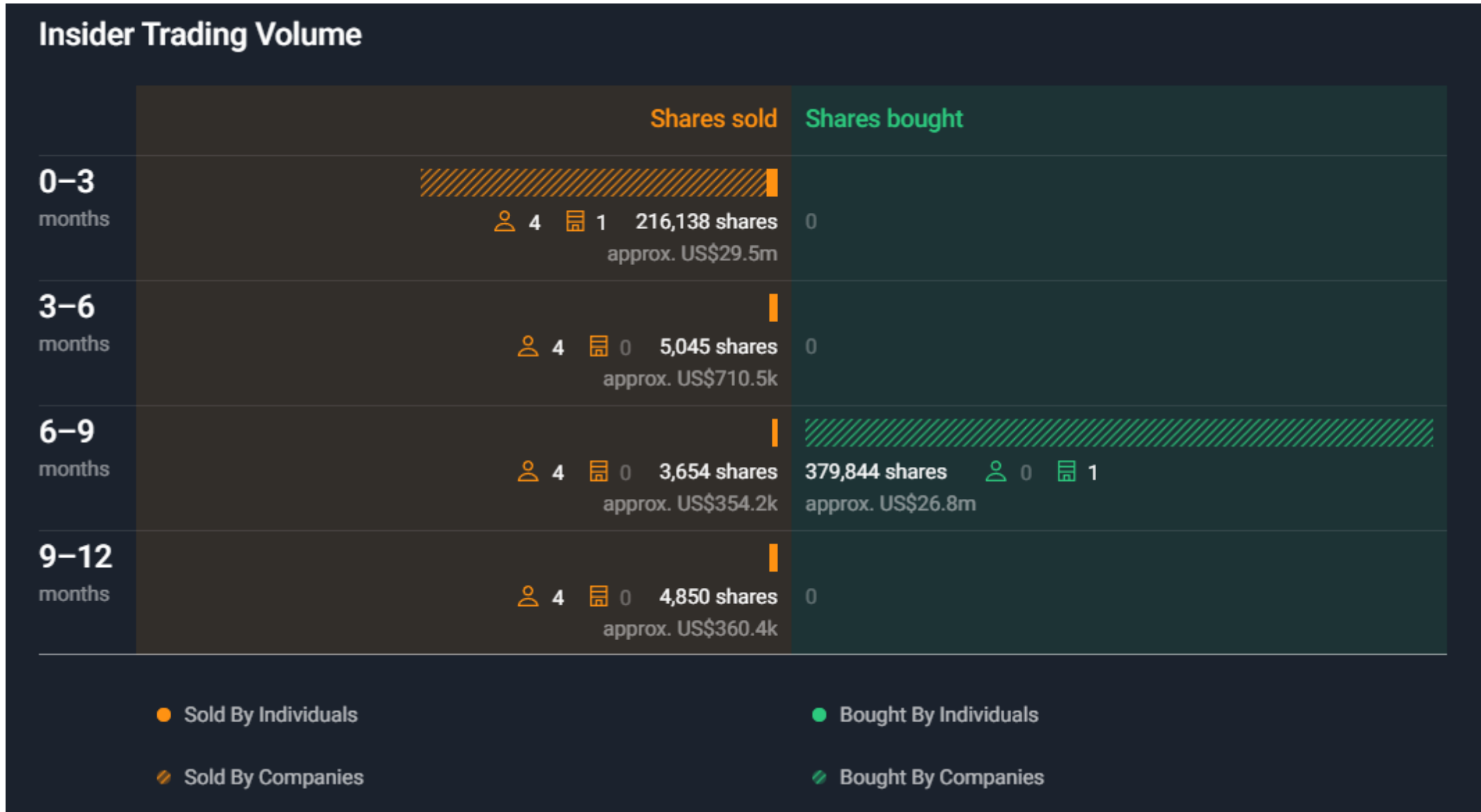
Exit EBITDA Multiple Justification

EBITDA Exit Multiple Calculation

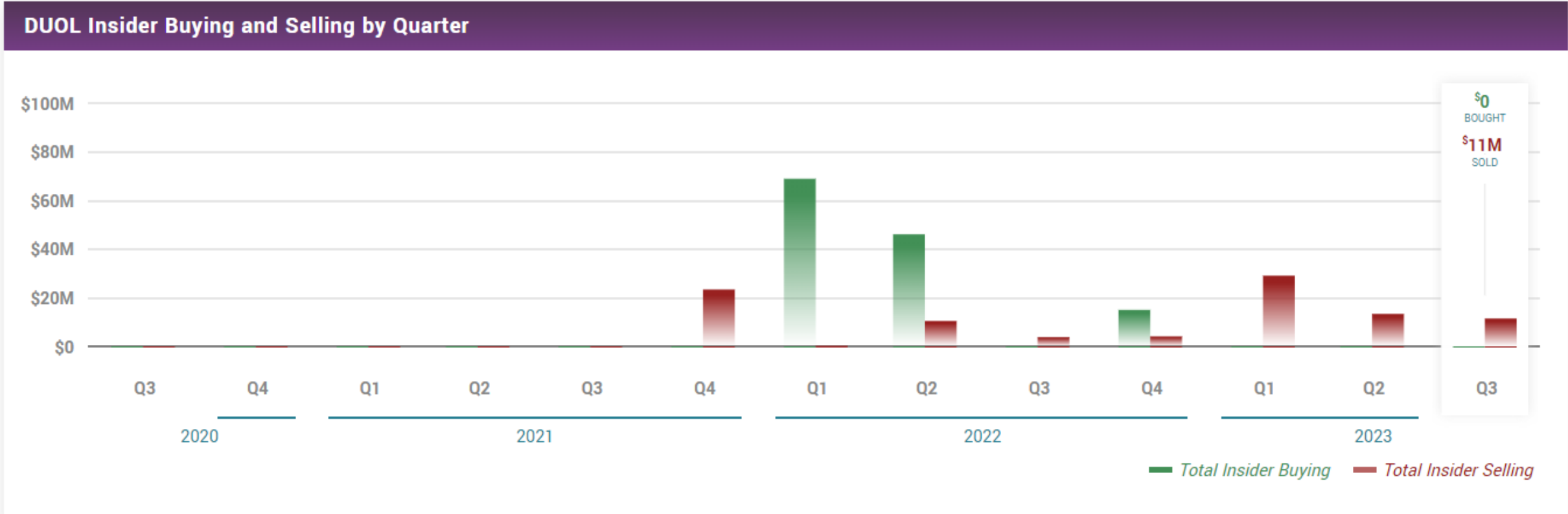
Industry	EBITDA Multiple	Weight
Software	30.92	10%
Commercial Education Services	23.88	40%
General Education Services	23.88	40%
Entertainment	26.54	10%
Exit EBITDA Multiple	24.85	100%

- DUOL is a software company with over **50%** of the company run by software engineers
- Categorised under **education services**
- Similarities to **entertainment industry** with the subscription-based revenue model and “gamified” product offerings
- Comparable set isn’t suitable as most of (if not all) Duolingo’s direct competitors are **private companies**
- Further, Duolingo is a premium company with a **strong brand** which justifies the higher multiples Duolingo is trading at when compared with the other competitors in the comparable set

Insider Trading Volume



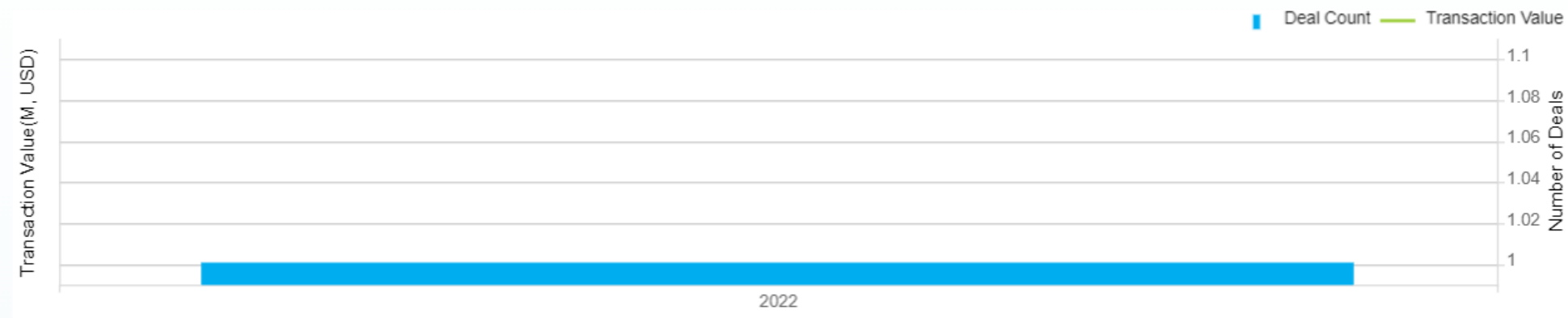
Insider Buying and Selling by Quarter



M&A Activity



Deal Activity



Includes cancelled transactions, Transaction value is not disclosed on all deals

M&A Summary



	Last 12 Months	All Transactions
Total Number of Transactions	1	1
Total Transaction Value	-	-
Average Transaction Value	-	-
Minimum Transaction Value	-	-
Maximum Transaction Value	-	-

Source: FactSet Mergers; USD, millions

Includes cancelled transactions, Screening results may differ

Top Advisors

Rank By: [Number of Deals](#)

No advisors disclosed on any deals

Source: FactSet Mergers; USD, millions

Includes cancelled transactions, Screening results may differ

All M&A Deals (1)



Announce Date	Close Date	Target	Acquirer	Deal Type	Transaction Value	EV/EBITDA	Role	Target Industry
04 Oct '22	04 Oct '22	Gunner	Duolingo, Inc.	Acquisition / Mer...	-	-	Buyer	Movies/Entertainm...

Source: FactSet Mergers; LTM, USD, millions

Management Past Experiences

- Prior CEO experience at reCAPTCHA
- MBA & PhD qualifications
- Strategy and financial roles come from roles at Goldman Sachs, McKinsey etc.
- Legal and M&A experience at Yahoo and VMWare

Technology Companies Which May Become Duolingo's Competitors

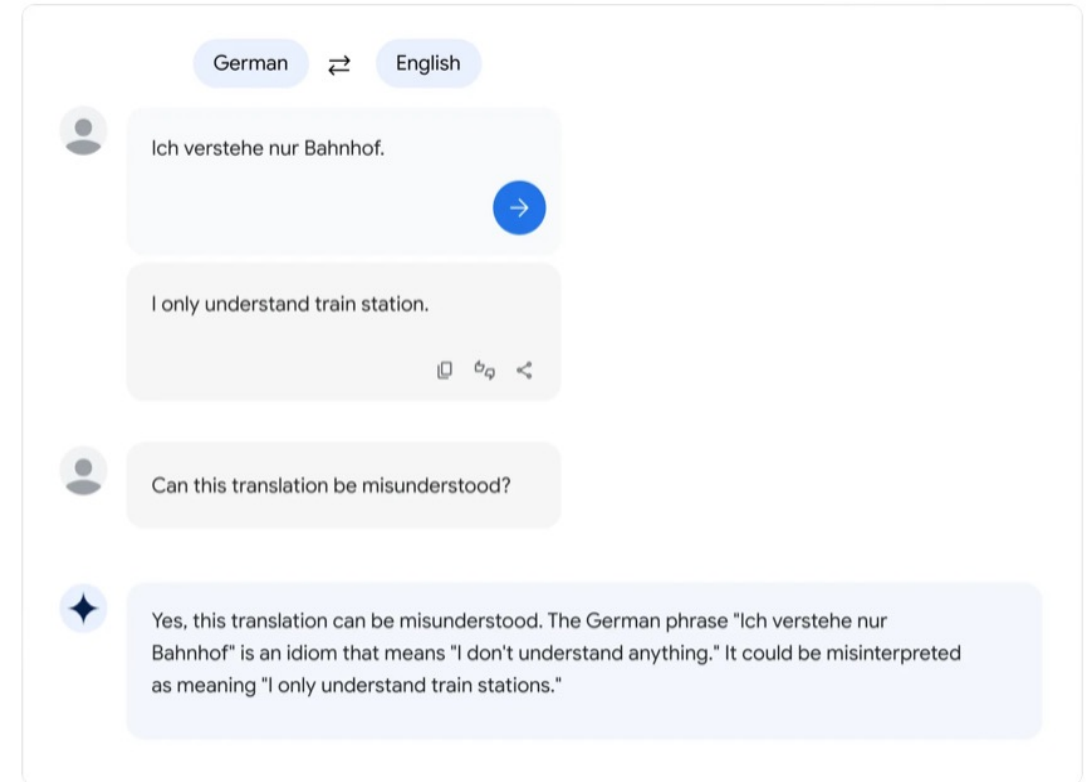
When addressing future competition, it can be thought of more as Duolingo forcing its way into the AI/tech space rather than the other way around



Google PaLM 2 Example Application



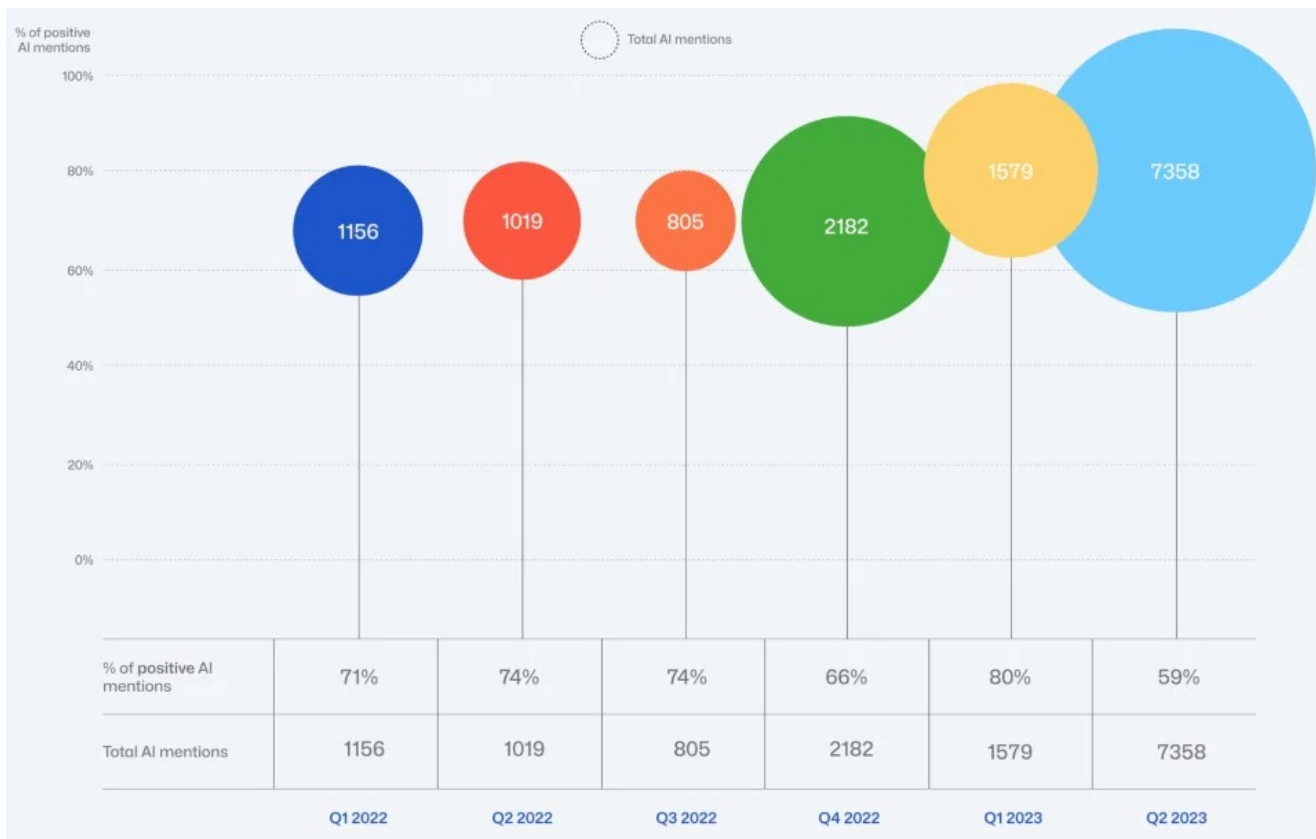
Multilingual translation



The screenshot shows a user interface for a multilingual translation application. At the top, there are two buttons labeled "German" and "English" with a double-headed arrow between them. Below this, a user input box contains the German text "Ich verstehe nur Bahnhof." and a blue arrow button. The output box shows the English translation "I only understand train station." with icons for copy, share, and a speech bubble. A follow-up question box asks "Can this translation be misunderstood?". A final response box, marked with a star icon, provides a detailed explanation: "Yes, this translation can be misunderstood. The German phrase 'Ich verstehe nur Bahnhof' is an idiom that means 'I don't understand anything.' It could be misinterpreted as meaning 'I only understand train stations.'"

PaLM 2 was pre-trained on parallel multilingual text and on a much larger corpus of different languages than its predecessor, PaLM. This makes PaLM 2 excel at multilingual tasks.

Mispricing due to AI Hype



- Companies that mentioned AI in earnings saw their stocks rise 4.6% on average, a study from Wall Street Zen found
- Meanwhile, companies that didn't mention AI saw stock gains of nearly half that
- Duolingo has emphasized their use of GPT-4 in their new subscription service

Still, veteran investor Rob Arnott on Tuesday called the chipmaker is a "textbook story of a Big Market Delusion."

"Overconfident markets paradoxically transform brilliant future business prospects into even more brilliant current stock price levels," he wrote in a note. **"Nvidia is today's exemplar of that genre: a great company priced beyond perfection."**

Analyst Price Targets



Duolingo Consensus Rating and Price Target (2023) ?

Consensus Analyst Rating

Hold

Based on 8 Analyst Ratings



Consensus Analyst Price Target

\$144.38

▼ -9.85% Downside

High Prediction	\$170.00
Average Prediction	\$144.38
Low Prediction	\$109.00

	Current 9/12/22 to 9/12/23	1 Month Ago 8/13/22 to 8/13/23	3 Months Ago 6/14/22 to 6/14/23	1 Year Ago 9/12/21 to 9/12/22
Consensus Rating	Hold	Moderate Buy	Moderate Buy	Moderate Buy
Strong Buy	0	0	0	0
Buy	3	4	4	6
Hold	5	4	3	1
Sell	0	0	0	0
Consensus Price Target	\$144.38	\$144.38	\$142.38	\$112.56
Predicted Upside	▼ -9.85% Downside	▲ 20.57% Upside	▲ 20.72% Upside	▲ 23.13% Upside

Porter's Five Forces

Threat of New Entrants STRONG

- Language learning algorithm is not particularly complex
- Much content is publicly available
- No incentive for users to stay loyal to the brand and no extra cost to change the brand

Threat of Substitutes STRONG

- YouTube lessons, websites, blogs, TikTok channels are alternatives
- Choosing a learning alternative requires no additional cost

Buyer's Bargaining Power WEAK

- Potential language learning market is likely to grow
- Its competitors mostly offer a traditional instruction-focused platform in a less minimal form
- Duolingo is easy to navigate, learn, and discover with minimal mapping

Supplier's Bargaining Power WEAK

- Content creation can be automated
- Technology providers are easy to implement if needed
- Google Store and Apple App Store both charge a 15-30% in-app purchase fee

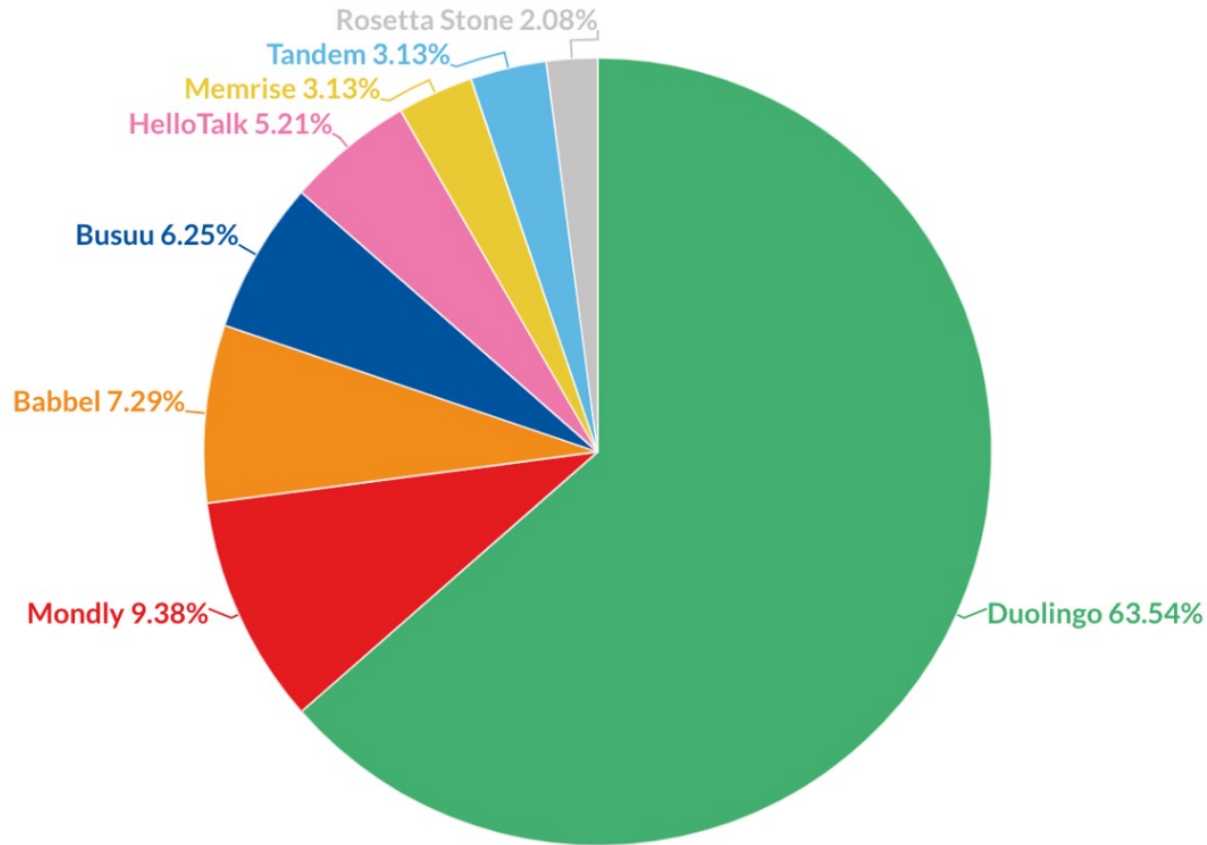


Rivalry Amongst Existing Competitors

- Duolingo's **accessibility, gamified approach and bite-sized lesson** appeal to a broader user base
- Duolingo is a market leader with its **freemium model**, maintaining **63.5%** market share and out performing its competitors
 - As the market saturates with AI advancements, Duolingo may face threat of competition from technology giants

Market Share

Duolingo is a market leader amongst its direct competitors in the online language learning industry



Most users were drawn to Duolingo’s **game-like feel**, thus the app received high levels of feedback on enjoyment

Most users of Babbel, Busuu, and Rosetta Stone found Duolingo too interactive and **less traditional**, thus received less acknowledgement for their interface design

To stay competitive, Duolingo could consider implementing a version that shifts from gamification to appeal to a more traditional audience

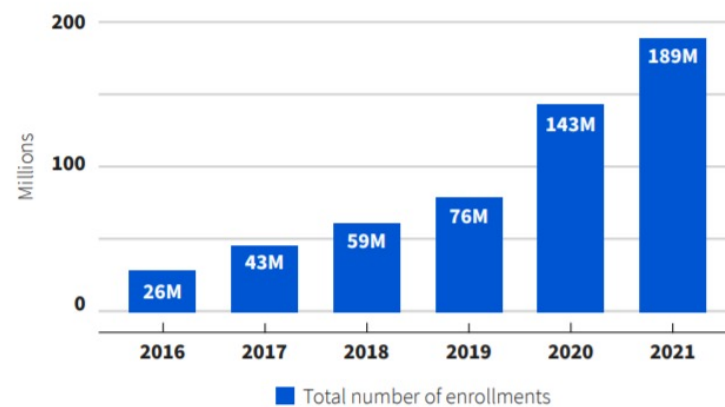
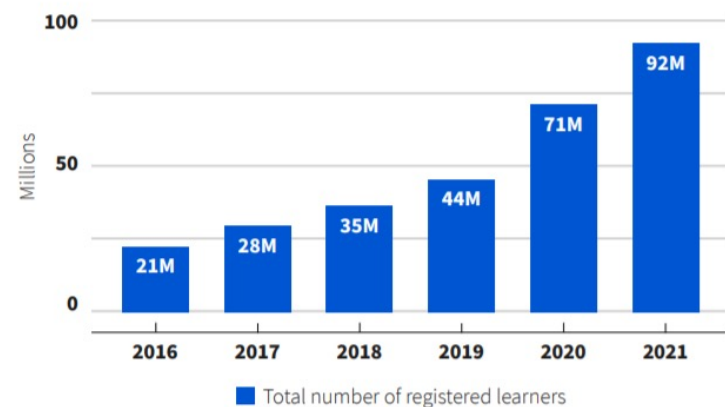
Impact of Covid on Industry



Online Education Industry

More learners are accessing online learning

The demand for online learning on Coursera continues to outpace pre-pandemic levels.



Top 10 countries with the most learners

Learners from around the world come to Coursera to build critical skills.



1. United States
17.3M



2. India
13.6M



3. Mexico
4.8M



4. Brazil
3.7M



5. China
3.3M



6. Canada
2.4M



7. Russia
2.4M



8. UK
2.4M



9. Colombia
2.2M



10. Egypt
1.6M


Possible Tailwinds For Duolingo

Possible Tailwinds For Duolingo And Why We Believe They Are Weak

APPENDIX

Expansion into language certificates

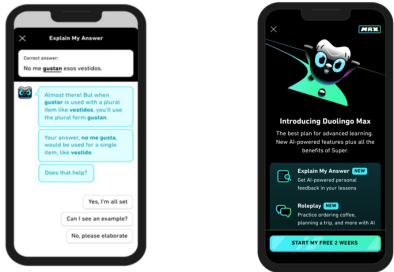
Duolingo has begun to offer more certified language tests, to act as a replacement for tests such as TOEFL and IELTS in English



They are also looking to Develop equivalents for the Spanish DELE, French DELF / DALF, German telc and Goethe tests, and thus a possible point of growth.

Introduction of AI Technology

Duolingo has implemented AI technology to enhance language learning possibly driving growth



Introduction of 2 new features namely Role Play and Explain My Answer.

Increased globalisation resulting in demand for a multilingual workforce

9/10 employees in the US rely on individuals who can speak a language other than English



US Bureau of Labour Statistics recently identified interpreters and translators as professionals in great demand, with expected job growth of 24% by 2030

Why this is unlikely to act as a strong tailwind

Institutional Validation

- Unpredictable as to whether educational institutions will validate Duolingo's assessments

Credibility/Market Share

- Competitors such as IELTS have significant credibility and in 2021 had almost 40% MS

Why this is unlikely to act as a strong tailwind

Competition From Tech Giants

- Tech giants are far better positioned to take advantage of AI in language learning

Costs/Expenses

- Significant expenses associated with the integration of the AI offsetting revenue growth

Why this is unlikely to act as a strong tailwind

Not Duolingo's Target Market

- Duolingo's gamification features, UI and overall positioning is aimed at users who learn a language out of passion/interest as opposed to enhancing themselves professionally
- Working individuals are more likely to utilise more formal language learning approaches

ARM IPO Case Study

ARM's IPO dependent on how much AI hype is priced in



- **“With the deal six times oversubscribed it looks like investors viewed the Arm IPO as an AI play and forgot to look at the price tag,”** wrote Daniel Morgan, senior portfolio manager at Synovus Trust, in a research note.
- Using the price-to-sales ratios of NVIDIA, AMD, Synopsys and Cadence for Arm would **imply a value of between about \$US32 billion and \$US43 billion**
- That is based on the \$US2.68 billion of revenue from Arm’s latest financial year. A representative for Arm declined to comment.
- That range jibes with what analysts at Bernstein Research suggested last month, when they wrote in a note that the company should be worth about \$US40 billion.
- If using an average blended forward price-to-earnings ratio across Nvidia, AMD, Synopsys and Cadence, then Arm would **need to generate \$US1.1 billion of income to justify a \$US40 billion valuation, or about \$US1.7 billion for a \$US64 billion value.**

Revenue Estimates

Revenue build using retention & conversion model in line with analyst estimates

Product Segments (M)



	Dec '18	Dec '19	Dec '20	Dec '21	Dec '22	Dec '23E	Dec '24E	Dec '25E	Dec '26E	Dec '27E	Dec '28E
Sales	-	-	-	250.8	369.5	514.8	651.7	795.2	893.1	1,031.2	1,242.0
Subscription	-	-	-	180.7	273.5	390.0	496.4	605.5	669.2	784.4	983.0
Non-Subscription	-	-	-	-	-	122.2	150.6	180.9	-	-	-
- Other	-	-	-	70.1	18.5	82.1	100.2	148.7	223.9	246.9	259.0
Bookings	-	-	-	294.2	428.6	566.9	700.0	851.6	996.9	1,167.0	-
Subscription	-	-	-	224.5	331.8	444.5	544.5	660.1	773.0	865.2	1,034.0
- Other	-	-	-	69.7	96.8	123.1	151.7	185.0	223.9	268.7	-

More ▾

Industry Metrics



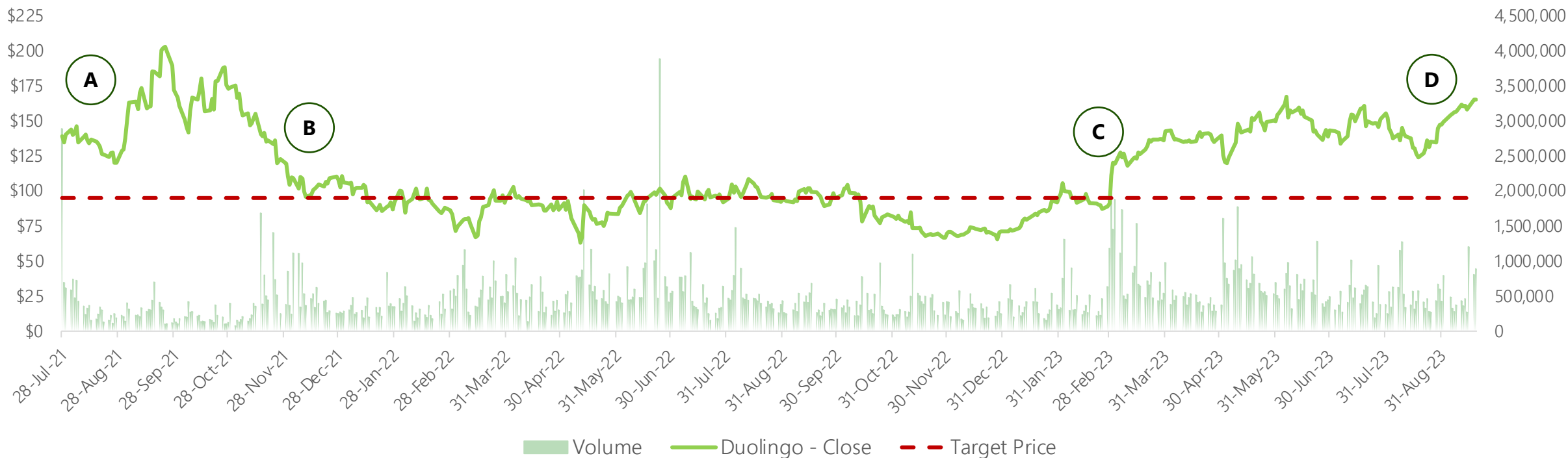
	Dec '18	Dec '19	Dec '20	Dec '21	Dec '22	Dec '23E	Dec '24E	Dec '25E	Dec '26E	Dec '27E	Dec '28E
Bookings	-	-	-	294.2	428.6	566.9	700.0	851.6	996.9	1,167.0	-
Guidance (Low)	-	-	-	282.5	414.0	569.0	-	-	-	-	-
Guidance (High)	-	-	-	285.5	417.0	575.0	-	-	-	-	-
Paid Subscribers	-	-	-	2,500	4,217	5,902	7,478	9,109	11,062	12,677	15,100
ARPU	-	-	-	-	6.76	6.02	5.75	5.65	5.50	5.49	5.70
Monthly Active Users (millions)	-	-	-	40.50	54.00	76.05	94.05	111.20	124.90	123.75	118.10
Daily Active Users (millions)	-	-	-	9.60	14.20	21.75	28.25	35.20	42.00	41.00	37.10

Income Statement (M)



	Dec '18	Dec '19	Dec '20	Dec '21	Dec '22	Dec '23E	Dec '24E	Dec '25E	Dec '26E	Dec '27E	Dec '28E
Sales	-	-	-	250.8	369.5	514.8	651.7	795.2	893.1	1,031.2	1,242.0

Duolingo Annotated Share Price Chart



Selected Events

Event	Date	Comment	Event	Date	Comment
A	July 2021	Highly sought-after Duolingo IPO sees shares priced at \$102 on July 27, 2021	C	March 2023	Duolingo announced the adoption of OpenAI's GPT-4 AI technology in Duolingo Max
B	October 2021	Poor macro environment and negative investor sentiment – rising interest rates and inflation	D	August 2023	Strong earnings release – beating Q2 earnings and revenue estimates, surprise profit



Nathan Yuan

Degree:

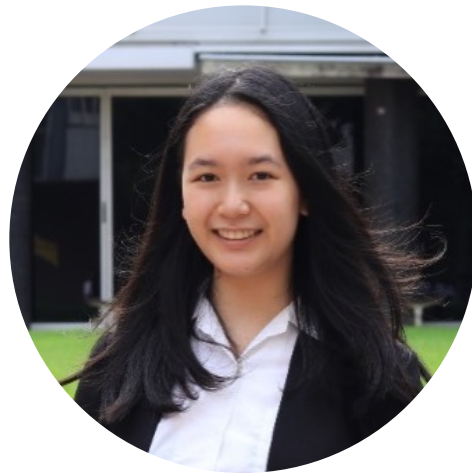
*Bachelor of Commerce (Finance) /
Actuarial Studies (2nd Year)*

Professional Experiences:

Investment Banking Intern @ Origin Capital

Extra-Curricular:

*Education Director @ UNSW I4C
Strategy Consultant @ UNSW 180DC*



Eva Lin

Degree:

*Bachelor of Commerce (Finance) / Science
(Mathematics) (3rd Year)*

Professional Experiences:

Project Consultant Intern @ Oliver Wyman

Extra-Curricular:

Vice-President Internals @ UNSW AIS



Ella Fu

Degree:

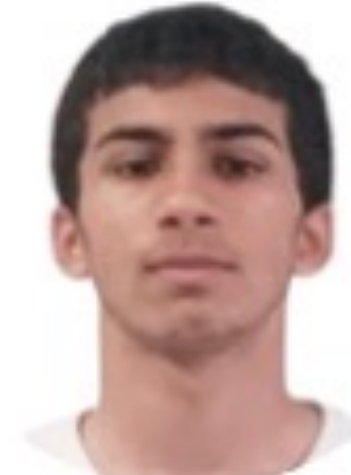
*Bachelor of Commerce (Finance) /
Actuarial Studies (3rd Year)*

Professional Experiences:

Market Risk Analyst @ Macquarie

Extra-Curricular:

Co-President @ UNSW AIS



Ashwin Rao

Degree:

*Bachelor of Laws / Commerce (Financial
Technology) (2nd Year)*

Professional Experiences:

23/24 Vacationer @ KPMG

Extra-Curricular:

Strategy Consultant @ UNSW 180DC