



### HIGHLIGHTS (Quarterly Focus: Lifetime Unit Economics Analysis)

- A Lifetime Unit Economics or “LUE”, entails the construction and analysis of a company’s retention, revenue, and contribution curve over the course of a unit’s lifetime—whether that unit be a customer, a store, or some other article—and is one of the central frameworks we use at HFP. It can be utilized for valuation, business improvement initiatives, and strategic decision making.
- We find that the investors do not afford the attention to LUE it deserves and thus overlook the insights an LUE analysis provides. It is an excellent tool to shed light on the quality of the customer base (or lack thereof) and the company’s earnings, as well as provide an alternate way to value a company.
- Below, we offer a primer on how to interpret the components of an LUE analysis as well as ways it can be used to extract value that might not initially be obvious

### INTRODUCTION

The Lifetime Unit Economic analysis (“LUE”) is essentially a complex P&L constructed at a unit level driven by a number of behavioral curves. The “unit” is often an individual customer, but can also be a store, a factory, a product line, or any discreet article which has both a lifecycle and business data tied to it. For a media company like Netflix, the unit would be each consumer subscriber that pays \$9.99 a month. For a software company, the unit is a contract that carries a subscription fee. One unit might be associated with several sub-licenses. For a retail operation like Chipotle, the unit is a store and the LUE analysis resembles a 4-wall profit & loss statement.

Why does an LUE analysis even matter? Because the analysis helps the reader develop a clear idea of where friction points and spots for improvement lie. It allows the subject company to predict the lifespan cash flows of future units, breaking down the drivers of a company’s revenue and costs at a degree of detail that allows the tweaking of key business decisions. Just a few examples of topics that can be addressed:

- *What is the average churn of a client on an annual contract versus a month-to-month contract?*
- *Do most customers tend to cancel in Month 4 or Month 13 and why?*
- *How will the ROI and payback period change if we reduce staffing and close one hour earlier?*

Another application is to derive per-customer or per-store financial metrics, then use that to calculate an enterprise value for the subject company based on the number of units in the company.

Surprisingly, an LUE analysis (at least a well-constructed one) is not as commonly used as it ought to be in the world of finance. This is particularly true in the public equity markets where data at a highly granular level is not disclosed or hard to obtain. Yet, even in the private equity world, we seldom come across this approach as a method to triangulate total enterprise value or TEV. When we do, the analysis tends to be superficial and riddled with inconsistencies. While some of the financial metrics from an LUE exercise seem obvious, in the right hands, these metrics can illustrate many insights not apparent to the naked eye.

On the following pages, we walk through a hypothetical example and explain the major components of an LUE analysis. Then we outline how to use this framework to i) derive an enterprise value for the whole company and ii) draw less obvious insights that can illuminate where operational improvements can be made.

“We rely heavily on understanding the unit economics of our customers’ business decisions in customer acquisition, marketing spend, and where to focus our time”

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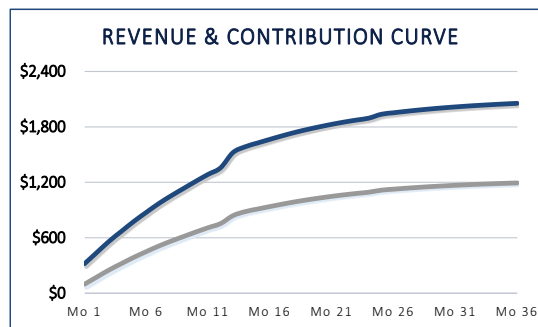
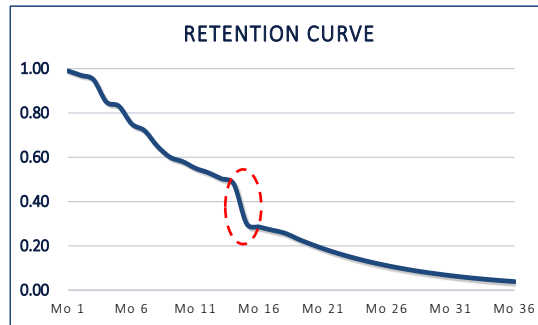
## SOFTPHARM – AN INVENTORY MANAGEMENT SOFTWARE COMPANY

Softpharm sells inventory management software to pharmacies. They derive revenues from i) subscription fees ii) transaction fees for each order of medication that is filled or refilled and iii) consulting fees for software implementation and upkeep, which are not recurring. Naturally, we think of each unit as a single master service contract with one client, even if Softpharm might have several pharmacy locations and be using several sublicenses.

The table below is an output of a basic LUE analysis (for the extended monthly model, please see Appendix. If you would like the full MS Excel file, please email us).

Lifetime Unit Economics		Lifetime (36 Months)	
Subscription Revenue	1,192	58%	
Transaction Revenue	395	19%	
Consulting Revenue	468	23%	
<b>Total Revenues</b>	<b>\$2,056</b>		
Server & Hosting	(65)	8%	
Customer Support	(175)	20%	
Transaction Processing Costs	(198)	23%	
Administrative Cost	(144)	17%	
Consulting Labor	(281)	33%	
<b>Total Costs</b>	<b>(\$863)</b>		
<b>Contribution</b>	<b>\$1,193</b>		

SUMMARY STATISTICS	
Avg Retention in Months	13.0
Avg Rev / Active Month (ARPM)	\$158
Avg Cont / Active Month (ACPM)	\$92
Contribution Margin	58.0%
Customer Acq. Cost (CAC)	\$642
Payback Months	10
ROI	1.9x



We have arbitrarily elected to use a 36-month LUE model for Softpharm for simplicity in illustration. In reality, the range of the analysis should be a balance between a i) a timeframe that encompasses the entire life of most of the company's customers and ii) a timeframe of retrievable historical records to construct the retention, revenue, and cost curves.

## INTEPRETATION OF RESULTS

- About 77% of a customers' revenues comes from recurring sources (subscription + transaction) while 23% come from non-recurring consulting fees.
- Server & hosting is the smallest constituent of cost, while consulting labor is the largest. The rest are split somewhat equally.
- The retention number, expressed in number of months, indicates how long on average a customer will remain in the system. While some customers stay much longer, a few drop off relatively quickly. For instance, if we start with a portfolio 100 customers, and only 97 remain by the end of Month 1, our retention value for Month 1 is 0.97. Using empirical data from a portfolio level, we can "unitize" the retention down to a customer level. We can see that on average, customers stay 13 months. This is the junction, as highlighted by the retention graph, where many accounts tend to exit the system.
- The Average Revenue per Month ("ARPM") and Average Contribution Per Month ("ACPM") are two important statistics that tell us how much on average a customer yields for each month they

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continue to be customer. ARPM or its equivalent (e.g. ARPU) is a common metric reported by companies in investor presentations and 10Ks.

- Though ARPM and ACPM can be applied across the entire portfolio of customers to determine how much the portfolio generates in revenue and contribution, we caution this is only appropriate when the customer base is well seasoned, or has entered a steady state (growth rates and churn rates have stabilized).
- The contribution margin of 58% is the average across the entire lifetime. Typically, the contribution margin is lower in the beginning and higher at end of a customer's life due to the reduced costs of serving the customer as they stay longer, though this can vary depending on the industry sector.
- The payback months measures how many months it takes to recoup the initial cost of acquiring that customer. This might not exactly equate to the same figure as taking ACPM divided by the customer acquisition costs ("CAC") because the contribution per month in the beginning part of a unit's life might be higher or lower than the lifetime average. Some companies factor the CAC into the cost curve, but we suggest breaking this cost out separately from the costs of serving a customer since those costs represent costs after a customer becomes a customer.

As customers season (i.e. stay longer), they are less likely to churn and tend to be stickier. Thus a portfolio of customers that are well-seasoned tend to have a stable churn rate. A company which is still rapidly growing their subscriber base and taking on new customers will find that the newer cohorts have higher and often volatile churn rates, bringing up the blended churn of the company. When speaking of "churn", it is important to keep in mind that churn is a metric that can only be empirically derived at the portfolio level. While it is a function of and related to an individual customer's retention, the two are *not* exact reciprocals of each other, even though most shorthand methods used by Wall Street analysts treat it as so.

## TRANSLATING INTO ENTERPRISE VALUE

How do we synthesize all this information into an approximation of a firm's enterprise value? First, we need to determine if the company has reached its steady state. To be clear, a company can still be growing its customer base, but at a rate that is steady and fairly constant. If a company has in fact reached steady state, the math is simple:

1. Row A to C: we annualize the ACPM and multiply that figure by the number of customers in the portfolio to determine the annual contribution from the customer base.
2. Row D to G: The growth rate of the portfolio less the churn rate is your net portfolio growth rate. This net growth rate can be a negative number if the churn exceeds the gross growth rate.
3. Row H: we use the perpetuity formula by taking the annual contribution and dividing that by the discount rate less the net growth rate to come up with the present value of the customer base.
4. Row I to J: if there are corporate level costs that have not been unitized and allocated on a variable basis, the PV of those items would also have to be deducted to arrive at the enterprise value.
- 5.

Enterprise Value Calculation		
A	Contribution Dollars Per Account per Year	\$1,098
B	Number of Customers	2,450
C=A*B	<b>Contribution from Customer Base</b>	<b>\$2,690,387</b>
D	Portfolio Gross Growth Rate	15.0%
E	Portfolio Churn Rate	10.0%
F=D-E	Net Growth Rate	5.0%
G	Discount Rate	15.0%
H=C/(G-F)	<b>Present Value of Customer Base</b>	<b>\$26,903,871</b>
I	Less PV of Corporate Costs	(5,000,000)
J=H-I	<b>Enterprise Value of Company</b>	<b>\$21,903,871</b>



Over-simplification in Wall Street initiation report at a time when Netflix was growing subscriber base 36% annually:

### Exhibit 44: NPV of a NFLX Subscriber

	2009E	1
1 / Monthly Churn		4.2%
= Subscriber Life (in months)		24.1

"We begin first with the average life of a NFLX subscriber. Using 2008 average monthly churn of 4.2%, this implies that the average life of a NFLX subscriber is 24 months or roughly 2 years. Based on monthly ARPU of \$13.49 and \$13.29, we calculate about \$162 and \$160 in annual subscriber revenue."

- Major Wall Street Bank

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If a company has not yet reached steady state, then we have to separate the customer base into two subpopulations: i) legacy customers and ii) future customers. The legacy subpopulation would be valued in the same fashion as above with a gross growth rate of 0% as it represents the steady state portion of the company.

The future customer bucket is where the complex math comes in. In order to accurately project future cash flows from this subpopulation, we have to create a “waterfall”. This is not the same as an equity waterfall used by private equity funds. This breed of waterfall forecasts the retention of the customers who enter the system (e.g. become a customer) on Month 1 through the course of this cohort’s life. We rely on the retention curve we derived in our LUE analysis. The same forecasting takes place for the cohorts that enter the system in Month 2, Month 3, etc. The result is an array that resembles a visual waterfall and sums up to the total count and contribution of all new customers.

In the analysis below, we illustrate the total count and contribution of customers for those entering in Month 1 to 6 but the concept would carry through to all cohorts (we’ve cut off anything beyond Month 6 due to space constraints). We assume the Month 1 cohort enters in January though in practice it can be any calendar month.

# of Customers		Jan	Feb	Mar	Apr	May	Jun
Cohort Month	# of Customers Entering System	Remaining Number of New Customers for Cohort Month					
Jan	100	99	97	95	85	83	75
Feb	125		124	121	119	106	104
Mar	150			149	146	143	128
Apr	175				173	170	166
May	200					198	194
Jun	200						198
⋮	⋮	99	221	365	523	700	865
		Net Number of New Customers					

Contribution from Customers		Jan	Feb	Mar	Apr	May	Jun
Cohort Month	# of Customers Entering System	Monthly Contribution from Each Cohort					
Jan	100	9,826	7,771	7,716	6,861	6,754	6,146
Feb	125		12,282	9,713	9,645	8,577	8,443
Mar	150			14,739	11,656	11,574	10,292
Apr	175				17,195	13,599	13,503
May	200					19,652	15,542
Jun	200						19,652
⋮	⋮	\$9,826	\$20,053	\$32,168	\$45,358	\$60,155	\$73,577
		Contribution Each Month from All New Customers					

This approach needs to be applied when the growth of new customers is sporadic and lumpy. Eventually it stabilizes and we’ll see steady monthly contribution numbers from this subpopulation. Then the perpetuity formula calculation could be employed to arrive at an NPV for the customer base at that future point in time.

**BUSINESS INSIGHTS**

How is the LUE analysis and surrounding framework best used? Below we outline eight ways.

**1. Compare it to other valuation methodologies**

The analysis we did above for Softpharm could be juxtaposed against traditional valuation methodologies: EV/EBITDA, P/E, or DCF, or sum-of-the parts analysis. All are valid approaches to valuing a company vis-a-vis an examination of its cash flows.

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**2. What portion of the enterprise value is attributed from legacy customers (low risk) and what portion is from future customers (carries execution risk)?**

This is a practical way for value-minded investors to determine how much of the enterprise value has been locked down by legacy customers which have low churn and are low risk, versus the amount of that needs to be contributed from future customers to justify the company's valuation.

**3. What is the payback and the ROI? Are they higher or lower than other initiatives and customer segments the company could pursue?**

We've seen paybacks range from several months to *never*. Our view is if a unit has a payback less than two years and a total ROI of 2.5x, it's got legs. If it has a payback of less than one year or ROI in excess of 4.0x, than the proposition becomes really compelling. Most VC funds target a ROI of 3.0x and payback in one year or less when evaluating SaaS models.

**4. Where are the drop off points in the unit retention curve?**

When we consult for our clients, one of the facets we examine in detail is where there are major drops in the retention curve. This often coincides with junctures where customers have easy outs such as the end of a 30-day free trial, end of 90 day initial term, the end of the first year, etc. Other times it's not so obvious—it could be dictated by the natural lifecycle of a service and its tendency to become stale over time. These insights are often incredibly helpful to isolate points that need to be redressed in the customer lifecycle. Typically, initiatives to preemptively avoid a customer defect are cheaper than the cost of acquiring a new customer.

**5. Where are the inflection points in the unit revenue or contribution curve?**

This is not the same question as #4: this analysis tells us where the stages of maximum value capture are. In some cases that value capture is greatest during the early months of a customer's life. However, it's important to distinguish whether the emphasis on value capture is on revenue or contribution. The emphasis will differ from company to company, and even at different points in time for the same company. A shallowing of the revenue curve may not correspond with the same inflection point on the contribution curve because the costs of servicing old customers is lower than servicing freshman customers.

**6. What line item is the majority of the revenue coming from? During what window in the lifecycle?**

Again this is an attribution analysis to determine where most of the value capture is coming from. One of our past clients had twelve distinct revenue streams for each customer. However, for the majority of customers, only four of those really mattered. About 75% of the revenues were also realized in the first year, so while we relied on a 3-year model, we knew most of the value could be harvested within the first year.

**7. What line items are the majority of the costs coming from?**

Dissecting costs line by line can often illuminate what is driving costs. It's important to bifurcate between true variable costs and allocated costs (e.g. fixed or semi-fixed costs that were unitized and allocated on a per-customer basis). The true cash costs are areas that have an immediate effect and can be dialed up or down quickly, whereas the allocated costs require more planning.

**8. Evaluating against other non LUE factors to determine customer attractiveness**

A Fortune 500 client carries a lifetime contribution of \$2000 and requires \$1000 in CAC for a 2.0x. A Non-Fortune 500 client carries a lifetime contribution of \$1000 and requires \$500 in CAC for the same 2.0x. However, there many more Non-Fortune 500 companies out there, they are easier to reach, and closing can take place much quicker. On one particular project, HFP came to realize the limiting factor was the time to close a customer. Our clients' sales agents had a finite amount of time in a day they could spend on the phone. On top of that, our client had contractual purchase obligations to meet that complicated how we determined which channel to focus the most marketing dollars on.

What's an investor to do in assessing whether an early SaaS company will yield a good financial return? We first need to measure Customer Acquisition Costs (CAC). As a general rule, if lifetime value is 3X or greater than CAC, that's a good sign that the business model is working.

- **Andreessen Horowitz**

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## APPENDIX

Lifetime Unit Economics	Mo 1	Mo 2	Mo 3	Mo 4	Mo 5	Mo 6	Mo 7	Mo 8	Mo 9	Mo 10	Mo 11	Mo 12
Retention Curve	0.99	0.97	0.95	0.85	0.83	0.75	0.72	0.65	0.60	0.58	0.55	0.53
Transaction Curve	900	927	955	983	1,013	1,043	1,075	1,107	1,140	1,174	1,210	1,246
(A) Subscription Revenue	0	96	94	84	82	74	71	64	59	57	54	52
(B) Transaction Revenue	22	22	23	21	21	20	19	18	17	17	17	17
(C) Consulting Revenue	297	4	5	3	4	4	4	2	2	4	4	2
<b>(D) Total Revenues</b>	<b>\$319</b>	<b>\$122</b>	<b>\$122</b>	<b>\$108</b>	<b>\$107</b>	<b>\$97</b>	<b>\$94</b>	<b>\$84</b>	<b>\$79</b>	<b>\$78</b>	<b>\$75</b>	<b>\$70</b>
<i>Cumulative</i>	<i>\$319</i>	<i>\$441</i>	<i>\$564</i>	<i>\$672</i>	<i>\$778</i>	<i>\$876</i>	<i>\$970</i>	<i>\$1,054</i>	<i>\$1,133</i>	<i>\$1,212</i>	<i>\$1,287</i>	<i>\$1,357</i>
<i>% Accumulated</i>	<i>16%</i>	<i>21%</i>	<i>27%</i>	<i>33%</i>	<i>38%</i>	<i>43%</i>	<i>47%</i>	<i>51%</i>	<i>55%</i>	<i>59%</i>	<i>63%</i>	<i>66%</i>
(E) Server & Hosting	(5)	(5)	(5)	(4)	(4)	(4)	(4)	(3)	(3)	(3)	(3)	(3)
(F) Customer Support	(15)	(15)	(14)	(13)	(12)	(11)	(11)	(10)	(9)	(9)	(8)	(8)
(G) Transaction Processing Costs	(11)	(11)	(11)	(10)	(11)	(10)	(10)	(9)	(9)	(9)	(8)	(8)
(H) Administrative Cost	(12)	(12)	(11)	(10)	(10)	(9)	(9)	(8)	(7)	(7)	(7)	(6)
(I) Consulting Labor	(178)	(2)	(3)	(2)	(2)	(2)	(2)	(1)	(1)	(2)	(3)	(1)
<b>(J) Total Costs</b>	<b>(\$221)</b>	<b>(\$44)</b>	<b>(\$45)</b>	<b>(\$39)</b>	<b>(\$39)</b>	<b>(\$36)</b>	<b>(\$35)</b>	<b>(\$31)</b>	<b>(\$29)</b>	<b>(\$29)</b>	<b>(\$28)</b>	<b>(\$26)</b>
<b>(K) Contribution</b>	<b>\$98</b>	<b>\$78</b>	<b>\$77</b>	<b>\$69</b>	<b>\$68</b>	<b>\$61</b>	<b>\$59</b>	<b>\$53</b>	<b>\$50</b>	<b>\$49</b>	<b>\$47</b>	<b>\$44</b>
<i>Cumulative</i>	<i>\$98</i>	<i>\$176</i>	<i>\$253</i>	<i>\$322</i>	<i>\$389</i>	<i>\$451</i>	<i>\$510</i>	<i>\$563</i>	<i>\$613</i>	<i>\$662</i>	<i>\$709</i>	<i>\$753</i>
<i>% Accumulated</i>	<i>8%</i>	<i>15%</i>	<i>21%</i>	<i>27%</i>	<i>33%</i>	<i>38%</i>	<i>43%</i>	<i>47%</i>	<i>51%</i>	<i>56%</i>	<i>59%</i>	<i>63%</i>

In the illustration above, we display the first twelve months of Softpharm's retention, revenue, costs, and contribution curve. Our model extends to Month 36 however, the concept can be explained through the first twelve months alone.

## Revenue

- (A) Is the amount of subscription revenue collected per account based on the retention curve multiplied by a subscription fee per active account per month
- (B) Is the amount of transaction revenue collected per account based on the transaction curve multiplied by a per-transaction fee
- (C) Is the amount of consulting revenue collected per account based on the consulting fees derived (non-recurring)

## Costs

Costs can be divided into two buckets:

1. True variable costs which are scaled up or down proportionately with the number contracts, number of customers, transactions performed by customers, or some other activity. Think of these as the COGS of the P&L. These include Lines G and I.

Other examples might entail:

- Any per transaction or processing cost
- Any rev share or IP costs that need to be paid to other licensors that are pegged to the number of customers, contracts, transactions, or usage activity
- A flyer, brochure, letter, or statement sent to solicit or support a customer
- The cost of each component that goes into a finished product (relevant only for a physical product)

2. Fixed or semi-fixed costs which can be “unitized” for calculation purposes and allocated based on the number of contracts, number of customers, transactions, or some other activity. Think of these as opex items which can be scaled up or down in the medium to long-term, but not necessarily in the short term. These include Lines E, F, and H.

Other examples might entail:

- Any hosting, server, and website costs
- Call center support
- Legal, compliance, professional costs incurred to support customers
- Utilities, gas, and electricity for a factory to produce units of products



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