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WHAT ARE DIGITAL FREIGHT BROKERS WORTH?

FREIGHTWAVES FREIGHTINTEL RESEARCH

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Executive Summary

The concept of total addressable market (TAM) is a hot topic in capital markets and investing today. A company's or industry's TAM is generally defined as the potential revenue opportunity available assuming full penetration at maturity. TAM analysis is an integral part of growth investing, and given a decade of stellar outperformance for growth investing compared to value investing, the concept of TAM has never been more relevant or widely employed.

In addition, the record-setting inflows from private equity and venture capital into the freight and logistics markets are all seeking to modernize and digitize what is perceived to be a largely non-automated but gigantic industry. Investors are measuring the scope of this opportunity using TAM analysis.

Given these factors, we believed it would be interesting to apply a TAM analysis to the hottest growth segment of freight – digital freight brokers (DFBs). To do so, we first had to come up with TAMs for the trucking industry and the freight brokerage industry to determine just how large the opportunity for digital freight matching could be.

In just a few short years, DFBs have grown exponentially, raising the specter of whether they represent a material threat to traditional freight brokers. Due to the DFBs' rapidly growing gross revenues (even though their net revenue base is likely quite small), their collective valuation has reached well into the billions of dollars based on the latest funding rounds. The prototypical bull case for DFBs centers around traditional freight brokerage being ripe for technological disruption because it is said to be a highly manual industry where the use of phones and email as the primary mechanisms for booking freight is still commonplace. By replacing humans and manual processes with algorithms and big data, DFBs believe they can dramatically reduce friction and inefficiencies.

In the following report, we conduct an analysis to determine what the true TAM is for DFBs. We also attempt to assess the reasonableness of current DFB valuations assuming their forecasted bright futures become reality.

In such a scenario, we believe the two or three winners in the race to blitzscale digital freight matching could be worth upwards of $10 billion dollars each (nearly $30 billion collectively) a decade from now. This estimate is only based on the U.S. and does not assume DFBs develop into platform companies with alternative revenue streams. Based on our survey work and qualitative research, we believe digital freight matching will need to consolidate down into just a few companies to reach its ultimate potential.

However, the path to that potential outcome is fraught with risk, leaving little room for errors in execution at current lofty valuations. And traditional freight brokers have taken note and are moving early to secure and defend their market positions against competitive intrusion, plowing billions into technology to create their own DFB apps and keep pace with the highly automated pure-play DFBs.

Have DFBs created a better mousetrap? Will the overall brokerage industry expand fast enough to allow both traditional freight brokerages and DFBs to grow and peacefully coexist? What will happen to the freight brokerage industry's margins and profitability? These are a few of the questions we attempt to answer in our report.

Key Highlights

- We view many Total Addressable Market (TAM) estimates as sensational, broadly inflated figures whose primary purpose is as a marketing tool and to generate a higher valuation. This does not limit their usefulness; however, one must scrutinize them closely.

- The overall, true trucking market TAM in the U.S. is more than 50 percent smaller than the generally referenced $700 to $800 billion figure often cited by the press. This is because about 50 percent of the market (private fleets) is not addressable by most market participants.

- The true TAM for brokerages is just a fraction of the often cited $700 to $800 billion U.S. trucking market. This is because brokers only sell into the for-hire market and then take a commission when doing so; thus, the $800 billion figure is not an addressable revenue opportunity for them. However, the brokerage market is growing at a healthy 7 percent clip annually and should continue to do so.

- We created a 10-year top-down model for the U.S. trucking market, freight brokerage market and digital freight brokerage market. Over the next decade, we purposely and aggressively assumed that DFBs take 50 percent market share of the overall U.S. brokerage market and raise their take-rates eight-fold in the process to stress test the reasonableness of their current valuations.

- We believe a lot must go right for DFBs to justify their current lofty valuations. If several key initiatives do go right, we are constructive on the outlook for DFBs as long-term investments. In our view, DFBs will need to take a great deal of market share, raise their commissions and margins, and the DFB market must consolidate down to just a handful of players. Our survey work already confirms that only three or four DFB apps have any real traction and users, so they are off to a good start on this front.

- Gross revenue is a highly flawed and misleading valuation metric for valuing freight brokerages. It is an important indicator for how the overall industry is trending and the potential for net revenues, but its usefulness in valuation is limited. We demonstrate how any DFB trading at multiples of its gross revenue (but only generating a low single-digit take-rate) is inherently expensive from a valuation perspective.

- Traditional freight brokers are not passively sitting by and allowing DFBs to take over the brokerage market in the U.S. Instead, traditional brokers are investing billions in their own technology and DFB apps to defend their market share. Given their long histories, resources and industry connections, we believe that it could be more difficult, take more time and be less profitable than generally expected for DFBs to take material market share.

- Instead of disrupting the freight brokerage industry, taking market share and creating highly valuable enterprises, in a negative (or bear case) scenario, DFBs could cause the overall freight brokerage industry to rapidly deteriorate in terms of collective commissions, margins and returns on capital. In other words, it is possible that a mutually destructive price war could ensue.

- Automating the freight brokerage market through technology and apps will not be an easy feat. Trucking is naturally human labor-intensive. We see traditional freight brokers and DFBs slowly transitioning over time to more closely resemble each other (traditional brokers will increasingly employ technology while DFBs will increasingly become more human labor-intensive).

- J.B. Hunt's (JBHT) stock could have 50 percent upside on a sum-of-the-parts basis if one accounts for the value of their 360 DFB platform using pure-play DFB peer valuations as "comps."

What is Total Addressable Market (TAM)?

TAM is defined as the revenue an industry or company could realize if it achieved 100 percent share of a market it could serve.

There are several viable, sound ways to estimate TAM. However, the simplest way to measure the absolute size of any market is as follows: TAM = the number of potential customers x the potential revenue per customer.

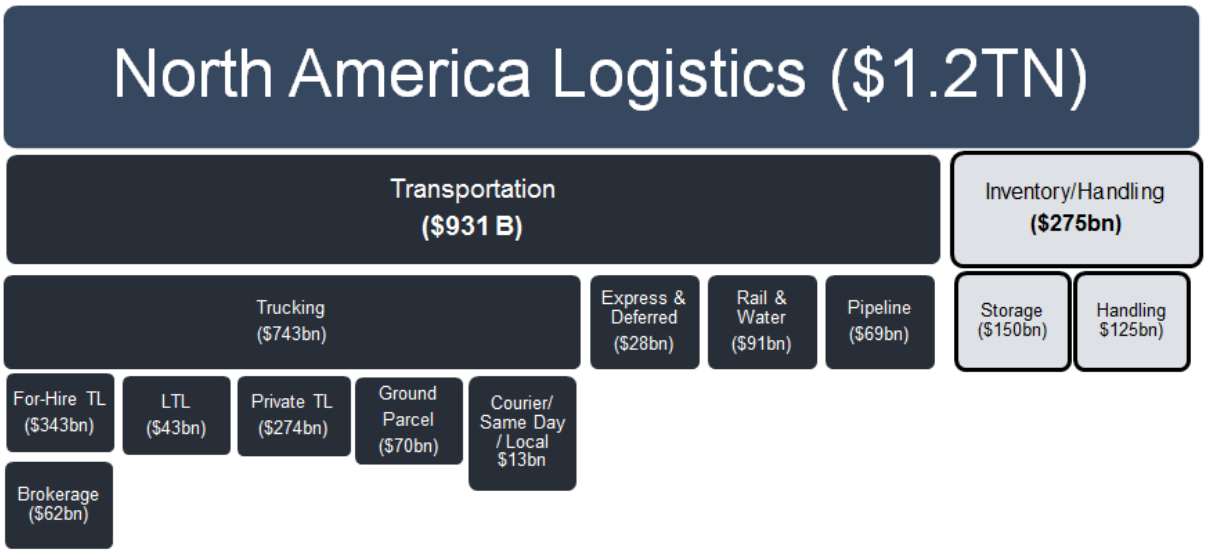
TAMs are especially common in investor presentations and initial public offering (IPO) roadshows to demonstrate the growth potential of any given company. It is commonplace for companies and their management teams to market themselves with eye-popping TAM numbers.

For example, Uber's CEO Dara Khosrowshahi recently said in an interview that the company serves markets with "$16 trillion" in total addressable market. We would note that this estimate corresponds to roughly 20 percent of The World Bank's 2018 estimate for global GDP (in U.S. dollars) of $86 trillion.

What is the True U.S. Trucking Market (TAM)?

A common refrain in the freight industry is that trucking represents between a $700 to $800 billion market annually in the U.S. We present an example in Figure 1 below that breaks down this overall number into granular parts.

Figure 1: Total N.A. Logistics TAM - 2018



Source: Goldman Sachs; SJ Consulting

While the $700 to $800 billion commonly cited TAM for the trucking market is true in theory, we believe this deserves further examination. The true TAM in our opinion is the $343 billion for-hire truckload TAM. This is because excluding private fleets ($274 billion) and other segments such as parcels ($70 billion) and courier ($13 billion) makes sense, given those segments are off limits to most suppliers, brokers or any other party with a vested interest in selling something to carriers or shippers. For example, a traditional (or digital) freight broker trying to do business with Halliburton's private fleet (which has greater than 5,000 tractors) is likely going to have a hard time breaking in. Therefore, the TAM for the U.S. brokerage business in our view is just $343 billion (equal to the U.S. for-hire full truckload market), meaning the usual quoted number of $800 billion is immediately reduced by more than half. We believe this is an important distinction.

After reducing the overall TAM down to the for-hire truckload market, we do not take issue with the $343 billion number (source: Figure 1 – Goldman Sachs; SJ Consulting). Our own research and analysis confirms that this is indeed a sound number.

Bottom-Up TAM for the U.S. Trucking Market

We cross-checked today's $343 billion TAM estimate for for-hire full truckload in the U.S. against our own bottom-up estimate presented below. As one can see, our $331 billion bottom-up TAM estimate comes quite close.

Figure 2: FreightWaves' Bottom-Up U.S. For-Hire Full Truckload TAM

Bottom-up TAM Estimate for U.S. for-hire full truckload (TL) Market	
Total for-hire interstate fleets (FreightWaves est.)	227,063
Total tractors (FreightWaves est.)	1,574,256
x Average revenue per mile	$2.00
x Average annual miles per truck (2,100 per week; 50 weeks; Engage estimate)	105,000
Total U.S. for-hire full truckload TAM ($ billions)	**$330.594**

Figure 3: FreightWaves' Estimated For-Hire Interstate Fleets and Tractors

Interstate For-Hire Carriers

Fleet Size	Total For-Hire Interstate Fleets	Total Tractors	%Total Fleets	%Total Tractors
1 Tractor	136,574	136,574	60%	8%
2 to 3 Tractors	44,944	104,083	20%	6%
4 to 20 Tractors	35,773	274,681	16%	16%
21 to 55 Tractors	6,580	208,960	3%	12%
56 to 100 Tractors	1,642	122,733	1%	7%
101 to 550 Tractors	1,343	277,119	1%	17%
551 to 5,000 Tractors	190	291,437	0%	17%
5,000 Plus	17	158,669	0%	9%
	227,063	**1,574,256**		

(Source: FreightWaves)

This is a TAM that is growing roughly 4 percent annually so the U.S. trucking market should approach $508 billion 10 years from now (in 2028) if it can match its historical average growth rate approximating nominal GDP.

FreightWaves' 10-year Model for the Trucking and Freight Brokerage Market in the U.S.

Below are our growth assumptions for the for-hire truckload market, the freight brokerage industry, and the digital freight brokerage industry in the U.S. going out 10 years to 2028. A primary objective of this paper is to test the validity and soundness of current valuations for DFBs. Viewed in that context, some of our estimates are intentionally aggressive.

The aggressive assumptions in our model include freight brokers doubling their market share from 18 percent to 35 percent and DFBs taking 50 percent share of the overall freight brokerage market 10 years from today. While certainly possible, we believe these to be blue-sky or bull case estimates in terms of the outlook for DFBs.

Figure 4: FreightWaves' 10-Year Top-Down TAM Estimates for U.S. Trucking, Freight Brokerage, and DFB Markets

	Year										
	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
U.S. for-hire full truckload (TL) market ($B)	$343.0	$356.7	$371.0	$385.8	$401.3	$417.3	$434.0	$451.4	$469.4	$488.2	$507.7
Grows at nominal GDP (4%)											
U.S. Brokerage Industry Gross Revenue ($B)	$62.0	$70.5	$79.7	$89.4	$99.8	$110.9	$122.7	$135.3	$148.7	$162.9	$178.1
Y/Y Growth		13.8%	12.9%	12.2%	11.6%	11.1%	10.7%	10.3%	9.9%	9.6%	9.3%
Penetration rate of overall U.S. FH TL	18.1%	19.8%	21.5%	23.2%	24.9%	26.6%	28.3%	30.0%	31.7%	33.4%	35.1%
U.S. Brokerage Industry Net Revenue ($B)	$9.7	$10.3	$11.0	$11.7	$12.4	$13.2	$14.1	$15.0	$16.1	$17.4	$18.9
Y/Y Growth		6.1%	6.6%	6.3%	6.2%	6.3%	6.5%	6.8%	7.3%	7.9%	8.5%
Net revenue margin/take rate/commission	15.7%	14.6%	13.8%	13.1%	12.5%	11.9%	11.5%	11.1%	10.8%	10.7%	10.6%
Assumed traditional brokerage take-rate	15.70%	15.45%	15.20%	14.95%	14.70%	14.45%	14.20%	13.95%	13.70%	13.45%	13.20%
Assumed DFB take-rate	1.00%	1.70%	2.40%	3.10%	3.80%	4.50%	5.20%	5.90%	6.60%	7.30%	8.00%
Blended take-rate	15.6%	14.6%	13.8%	13.1%	12.5%	11.9%	11.5%	11.1%	10.8%	10.7%	10.6%
Mix of traditional brokerage	99.0%	94.1%	89.2%	84.3%	79.4%	74.5%	69.6%	64.7%	59.8%	54.9%	50.0%
Mix of DFB	1.0%	5.9%	10.8%	15.7%	20.6%	25.5%	30.4%	35.3%	40.2%	45.1%	50.0%
Traditional Brokerage Industry Gross Revenue ($B)	$61.4	$66.4	$71.1	$75.4	$79.3	$82.6	$85.4	$87.5	$88.9	$89.5	$89.0
Traditional Brokerage Industry Net Revenue ($B)	$9.6	$10.3	$10.8	$11.3	$11.7	$11.9	$12.1	$12.2	$12.2	$12.0	$11.8
Y/Y Growth in T.B. net revenue		6.4%	5.3%	4.3%	3.4%	2.5%	1.6%	0.7%	-0.2%	-1.2%	-2.3%
DFB Industry Gross Revenue ($B)	$0.6	$4.2	$8.6	$14.0	$20.6	$28.3	$37.3	$47.8	$59.8	$73.5	$89.0
DFB Industry Net Revenue ($B)	$0.0	$0.1	$0.2	$0.4	$0.8	$1.3	$1.9	$2.8	$3.9	$5.4	$7.1
Y/Y Growth in DFB net revenue		1041.2%	191.9%	110.7%	79.5%	62.9%	52.4%	45.3%	40.0%	36.0%	32.8%

Traditional Freight Brokerage TAM

What long-term penetration rate for freight being booked through brokers is reasonable? We postulate that there is a natural ceiling for this figure well below 50 percent because shippers and carriers likely do not want to split revenue or share sensitive data with a broker (digital or traditional) if they do not have to or if the broker is not providing value in some way (saving them time or money or giving them access to people or resources they do not possess). Shippers will always want to move the majority of freight through their contracted carriers in our view.

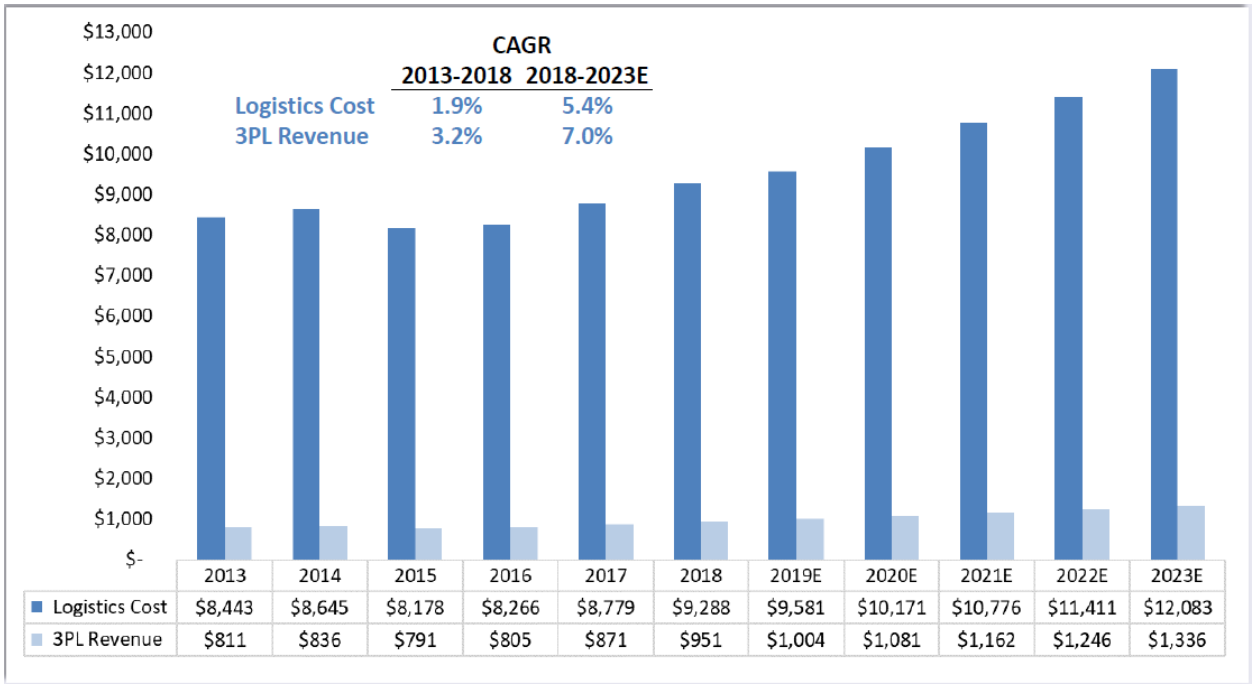
Our best estimate for where freight brokerage gross revenue as a percent of the overall U.S. for-hire full truckload revenue plateaus and stabilizes is at about 35 percent. This level would represent a doubling in penetration compared to today's market share for freight brokers of 18 percent.

Embedded within that estimate is the assumption that overall commission rates for the industry will drift down over the next decade because we expect traditional freight brokers will have to lower their fees to fend off aggressive discounting from DFBs. In addition, we expect DFBs will have to raise their net revenue margins from about 1 percent today to 8 percent by 2028 as they will eventually need to be

profitable. We do not believe DFBs will be able to achieve anywhere near the current industry average net revenue margin of approximately 16 percent, especially if they plan to hit elevated growth targets and deliver on expectations for substantial market share gains. The end result is an overall blended margin for the freight brokerage industry that we forecast will fall from 15.7 percent today (source: TIA) down to 10.6 percent in 10 years – assuming DFBs are able to take 50 percent of the market.

Finally, in order for freight brokers to double their market share from 18 percent today to 35 percent by 2028, we believe that freight brokers as a whole will have to lower commissions, which means that net revenue will grow at a far slower pace than gross revenue. Our net revenue compound average growth rate (CAGR) estimate for the overall freight brokerage industry in the U.S. is 6.9 percent over the 10-year forecast horizon. This aligns closely with Armstrong & Associates' forecast of a 7 percent CAGR for third-party logistics provider (3PL) revenue from 2018-2023 (see Figure 5 below).

Figure 5: Armstrong & Associates' Forecast for 3PL Growth Through 2023



	2013	2014	2015	2016	2017	2018	2019E	2020E	2021E	2022E	2023E
Logistics Cost	$8,443	$8,645	$8,178	$8,266	$8,779	$9,288	$9,581	$10,171	$10,776	$11,411	$12,083
3PL Revenue	$811	$836	$791	$805	$871	$951	$1,004	$1,081	$1,162	$1,246	$1,336

Source: Armstrong & Associates

Digital Freight Brokerage TAM

Pure-play digital freight brokerage (DFB) market share of the total U.S. freight brokerage industry is approximately 1.5 percent today ($1 billion/$62 billion). To get to $1 billion, we assume $500 million in gross revenue for Uber Freight, $300 million for

Convoy, $100 million for Transfix and $100 million for all others. If one includes the digital freight brokerage gross revenue from traditional freight brokers (i.e. J.B. Hunt 360, XPO Drive, Coyote Go, etc.), then we believe the penetration rate today could be approaching 2 to 3 percent.

Top-Down TAM for DFB

For our top-down DFB TAM estimate, see Figure 6 below. We estimate a total top-down TAM (in terms of net revenue) for DFBs of $7.1 billion in the U.S. at maturity in 2028. We define "maturity" as the point in time when DFBs begin to grow their revenue at or below the overall growth rate in the U.S. economy and when market share and take-rate plateau and begin to level out. For this report, we assumed a maturity timeline of 10 years, which is why the total trucking market TAM is about $508 billion in 2028 instead of $343 billion in 2018 (based on a 4 percent compound average growth rate)

Figure 6: FreightWaves' Top-Down TAM for DFB Market

DFB TAM ($ millions): Top-Down		Today
For-hire full truckload market in U.S.	$507,700	4% 10-year CAGR
Potential long-term broker market share	35%	18%
Gross revenue TAM for brokers	**$177,695**	
DFB market share of total brokerage	50%	1.5%
Potential long-term DFB commission/take rate	8%	2.0%
Net revenue TAM for DFBs	**$7,108**	
Potential total market cap of DFBs @ CHRW 4.2x net revenue multiple	**$29,926**	
CHRW Net Revenue (2018)	$2,705	
CHRW market capitalization	$11,389	
CHRW net revenue multiple	4.2x	

The primary takeaway in our view is that an estimated $30 billion in potential market value in the U.S. for DFBs in 2028 validates their existence and strategy. This is particularly true if the market is able to consolidate down into an oligopoly structure

(meaning only a handful of players) because this suggests the leaders could perhaps garner a market capitalization of $10 billion (or higher). The biggest pure-play DFB today is valued in the range of $1 billion, implying a huge upside if a winner-take-all or a-few-winners-take-most market structure develops. We think an oligopoly market structure for DFBs is the most likely outcome and our survey work confirms this.

For our normalized valuation benchmark, we use C.H. Robinson's (CHRW) net revenue multiple. This seems reasonable given CHRW is the largest blue chip with leading market share, elite scale and a steady-state, mature margin structure that we believe is representative of what DFBs can obtain in a best case scenario.

We believe a lot must go right for DFBs to justify their current lofty valuations. Specifically, we think all (or most) of the following conditions must occur: DFBs must take a great deal of market share; raise their commissions and margin structure considerably to reach profitability; and, lastly, the market must consolidate down into just a handful of players.

Potential Profitability of DFBs

Another important consideration is the potential profitability of DFBs. DFBs have maintained they can operate at a lower expense structure relative to traditional brokers.

CHRW currently has a 25 percent net margin on its net revenue ($665 million in net income on net revenue of $2.7 billion). Embedded within this 25 percent net margin for CHRW is approximately $1.5 billion per year that the company spends on "personnel expenses." Should the DFBs be able to operate with a fraction of the personnel, all else equal, this would suggest that the DFBs net margins could achieve a higher level than CHRW. If that were to occur, the market would likely award DFBs meaningfully higher valuation multiples given higher returns on capital and free cash flow generation.

For simplicity's sake, using our top-down TAM of $7.1 billion in total DFB industry net revenue in 2028 and $30 billion in collective market capitalization, a 25 percent net margin on net revenue of $7.1 billion would imply $1.8 billion in net income for DFBs in 2028. At a collective valuation of approximately $30 billion for DFBs, this would equate to 17 times price-to-earnings, which is roughly in-line with both CHRW and the S&P 500 today.

Bottom-Up TAM Estimate for DFBs

For our bottom-up DFB TAM estimate, see Figure 7 below. We estimate a total bottom-up net revenue TAM for DFBs of $4.3 billion in 2028. One big point of contention is that we use our own estimates for the number of trucks. We believe the FMCSA numbers are significantly inflated and overstated for a host of reasons. Using our more accurate truck numbers reduces our TAM relative to others' estimates by a meaningful degree.

We again assumed a timeline of 10 years for DFBs to reach maturity. To accurately account for this in our bottom-up model, we needed to adjust the average revenue per mile (including fuel) of approximately $2.00 today to $2.50 in 10 years, driven by a 2 percent CAGR. We based the latter estimate on the long-haul truckload producer price index (PPI) (source: U.S. Department of Labor) for contract trucking rates, which have grown at a 2.2 percent CAGR going back to 1996 (the inception of the data series). Given the volatility of spot rates, it did not make sense to try to forecast spot rates 10 years out.

Finally, our 10-year bottom-up model produces a TAM of $4.3 billion for DFBs compared to $7.1 billion in our top-down model because we assumed that DFBs will only address the spot market and fleets of 20 trucks or fewer. This is fair in our view, but is a more punitive assumption and could prove wrong should DFBs increasingly win new business and market share with larger fleets.

Figure 7: FreightWaves' Bottom-Up TAM for DFB Market

DFB TAM ($ millions): Bottom-Up		
Average annual miles per truck (2,100 per week; 50 weeks)	105,000	
Average revenue per mile	$2.50	2% 10-year CAGR vs. $2.00 today
Number of trucks (fleets <21 trucks)	515,000	
Gross revenue TAM for DFBs	**$135,188**	
Spot market mix of small fleets (<21 trucks; weighted average)	40%	
Potential long-term DFB commission/take rate	8%	
Net revenue TAM for DFBs	**$4,326**	

Figure 8: FreightWaves' Estimated For-Hire Interstate Fleets and Tractors

Interstate For-Hire Carriers

Fleet Size	Total For-Hire Interstate Fleets	Total Tractors	%Total Fleets	%Total Tractors
1 Tractor	136,574	136,574	60%	8%
2 to 3 Tractors	44,944	104,083	20%	6%
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101 to 550 Tractors	1,343	277,119	1%	17%
551 to 5,000 Tractors	190	291,437	0%	17%
5,000 Plus	17	158,669	0%	9%
	227,063	**1,574,256**		

(Source: FreightWaves)

A Word of Caution on DFB TAMs

DFBs primarily target the spot market and smaller carriers and are not naturally suited for enterprise accounts. Given the vast majority of industry revenue (as much as 80 percent) moves via contracted freight, this naturally limits the DFB's TAM in our view.

An app backed by very few salespeople is really designed for the spot market. To break into larger enterprises, a DFB will likely need a larger salesforce just to get its foot in the door, negotiate the contract and service the account. Should DFBs significantly increase their salesforce headcount, this dynamic could change. But it would also run counter to their automation ethos and goal of a lean expense structure.

In sum, we believe DFB apps are inherently set up to be a transactional or spot business model. If shippers and carriers want to negotiate contracts to move a significant portion of their freight, we believe they will just do so directly (or through a human broker).

Digital Freight Brokerage TAMs and Valuations Could Expand Significantly Through International Expansion and By Adding Complementary Revenue Streams

While this may seem intuitive, we believe DFBs have ambitions beyond just digital freight matching and will need to develop alternative, complimentary revenue streams over time to grow into their valuations. However, it is difficult to come up with an explicit forecast for when, how and in what new markets this process will play out.

That being said, the DFBs have already entered adjacent markets such as drop-and-hook trailers pools, payments (factoring of receivables) and transportation management systems (TMS) in an attempt to grow their prospective TAMs. The TMS market is very crowded, arguably as competitive as freight brokerage, and giving away a free TMS is not even easy. All of the former new markets are designed to streamline industry pain points via digitization and simplification. We are in the early innings here and it is too early to tell how successful they may be but we believe they all hold significant potential.

Should DFBs be able to successfully transition into "platform" companies with other substantial business lines (much like Amazon and the other "FANGs" have), this could greatly increase their potential market value.

Moreover, our estimated TAM only represents the U.S. If DFBs are able to replicate this success and market share internationally in other large freight markets like Europe and Asia, the potential collective valuations could be multiples higher.

Traditional Freight Brokers Have Developed Their Own Competing DFB Apps and Are Heavily Investing in Technology to Defend Their Turf

Taking 50 percent market share may not be an easy feat for the DFBs. Using *Transport Topics* 2019 top freight broker list, we estimate that there are 67 freight brokers in the U.S. generating $100 million or more in gross revenue that together account for approximately $51 billion in gross revenue (or 82 percent of the overall U.S. freight brokerage market).

Therefore, in order for DFBs to accumulate 50 percent market share, they will have to put the voice brokers that account for 18 percent of industry revenue out of business and take 32 percentage points of market share away from large freight brokers. And

then they will have to raise their net revenue margins eight-fold in the process of taking 50 percent market share to hit the targets in our model.

For greater context, our model assumes that DFBs will collectively generate close to $90 billion in gross revenue 10 years from now (compared to $1 to $2 billion today); it has taken C.H. Robinson 114 years to reach $16 billion. We believe technology will allow DFBs to scale much faster than historical precedent but this is undoubtedly an aggressive target.

Traditional freight brokers are not sitting on their hands and rolling over. In fact, they are doing the opposite. Traditional freight brokers are investing billions in new digital freight matching platforms and apps. Examples of these include: TQL, XPO Drive, C.H. Robinson Navisphere, Coyote Logistics Go, J.B. Hunt 360, and EchoShip. In addition, traditional load boards DAT and Truckstop have also developed their own freight matching apps.

The Conundrum Publicly Traded Brokers Face

Traditional freight brokers will need to invest billions more in technology to defend their market share from intrusion by DFBs. They are already starting to do so. Even then, there is no guarantee that they will be successful. As a public company, the markets generally want to see steady, growing sales and earnings streams. Investing hundreds of millions (or billions) in technology makes the former objective difficult to achieve. If there is a payoff, it would naturally come with a long tail and short-term pain.

This leaves traditional freight brokers (all traditional freight brokers but especially publicly traded ones) facing a difficult choice. There are essentially three routes they can take: underinvest to maximize current earnings and profitability; heavily invest and cut (at least near-term) earnings power; or some combination of both (a “one foot in, one foot out” approach).

Because DFBs likely have very different shareholder bases than publicly traded traditional freight brokers, and shareholders that are likely to prioritize growth a great deal more than profitability, this dynamic causes difficult decisions for traditional freight brokers whose shareholder bases are more likely to value consistent, linear growth and return of capital. Often times, companies that need to make huge investments with a large upfront hit to earnings and an uncertain return on investment prefer to do so as a private company without close scrutiny because public markets typically do not like wide swings in profitability and high uncertainty. We think this dynamic makes the third path the most likely. The other option that

can serve as an effective hedge is to push more traditional freight brokerage business through the DFB app.

Another problem is that many public company executives' compensation is tied to bottom-line targets such as earnings per share or free cash flow growth. This naturally limits their appetite for risk-taking – spending large sums of money on technology investments with an uncertain payoff would detract from their ability to hit these targets. We believe this factor could limit traditional brokers' aggressiveness with respect to investments in DFB because it makes it hard for them to go "all-in."

Private equity (PE)-backed companies wishing to compete in digital freight matching face the same problem. PE is a large and active investor in traditional freight brokerages. However, PE sponsors typically like to employ high leverage to magnify returns as well as run a lean cost structure. We believe that investing billions in technology would run counter to these goals. We also think the long-term commitment to burning cash (beyond the typical five-year life of most PE funds) that will be necessary to simply keep up with DFBs is a factor that will cause most PE investors to refrain from joining in an arms race.

An Example of the Public Markets Rewarding Aggressive Investments By Legacy Incumbents

We have seen similar situations play out across all industries. Any time a new player enters a market with disruptive technology, a new strategy and a lot of cash to invest, legacy market leaders are faced with the same difficult situation.

An example of a success story is Disney. Recently Disney chose to go all-in on streaming via its Disney Plus streaming product and to take on Netflix directly. This was a risky proposition as Disney not only had to invest billions into launching a streaming product, but is foregoing a similar amount in high margin licensing revenues by pulling its content from Netflix's streaming platform. This has proven to be a double-hit to earnings in the near-term.

However, despite Disney Plus not even launching until November 2019, the market has rewarded its bold strategy by sending Disney's stock up by 45 percent despite the drag to earnings because its heavy investments are being viewed as vital to securing its dominant long-term positioning and growth prospects. In the process, Netflix's stock has also recently taken a hit and investors are forecasting a further subscriber slowdown due to competition from Disney. Prior to the recent run, Disney's stock was flat for five years in spite of its solid earnings growth because its

valuation compressed due to market fears over its long-term viability in an increasingly streaming world dominated by Netflix.
The stock market implies that it's always better late than never in terms of defending market share. For example, Disney was probably five years late in its competitive response. In contrast, the traditional freight brokers have begun investing earlier – before DFBs have validated their strategy at scale – which should make taking market share incrementally more difficult.

We believe this process will play out over the next decade in the freight brokerage industry and will be interesting to watch.

What If the Entry of DFBs Damages the Overall Long-Term Growth, Profitability and Returns of the Freight Brokerage Industry?

One possible but unlikely scenario that we can envision is one in which the DFBs take a copious amount of market share but significantly lower the freight brokerage industry's overall take-rate, margin structure and return on invested capital. In other words, a price war or race to the bottom in net revenue margins could ensue. This represents the bear case on the DFB industry.

If this were to occur, the freight brokerage market might increase its share of freight bookings and DFBs may be a catalyst for driving a lot of brokerage industry gross revenue, but it ultimately could come at the expense of collective profitability. The end result could be a far more efficient, technologically advanced freight brokerage industry with a much lower commission and margin structure in which most of the net benefit and consumer surplus accrues to shippers and carriers.

An analogy that we believe could play out in a bear case scenario is online stock trading brokerages. Commissions in both retail and institutional stock brokerage have collapsed in recent decades due to the application of sophisticated technology to stock trading. We are not forecasting this outcome and do not think it to be a likely probability, but we believe this represents a material risk factor that bears watching.

Automating DFB Apps is Not As Simple As Automating Dominant Consumer Apps Like Ride-Hailing

Problems are a normal way of life when moving freight. Just ask anyone who has ever been a freight broker. Digital freight matching is not as simple as giving passengers a ride.

This means that DFBs in all likelihood will have to hire many more sales and operations employees to service clients (much like a traditional freight brokerage) than the companies themselves or the general consensus expects. This calls into question the notion that DFBs can structurally operate at a lower break-even point and commission rate.

However, should DFBs have to raise their commission structure to better align with traditional freight brokers because break-even profitability levels adjust higher, then this would then call into question their ability to rapidly take market share by charging lower fees due to automation.

All of this likely means that traditional freight brokers will increasingly become more like DFBs (more technology-intensive) and DFBs will become more like traditional brokers (more people-intensive).

In our years following the markets, we have witnessed similar dynamics in several other sectors. For example, Amazon is slowly becoming more and more similar to brick and mortar retailers while the latter become much more Amazon-like and e-commerce focused.

Why a Valuation of 4 Times Gross Revenue is Speculative

We are constructive on the outlook for DFBs. We think automating the movement of freight is a worthy goal that is long overdue. However, there is no denying that the current valuations for DFBs are lofty and in some cases approaching nosebleed territory.

It is important to note that we do not take issue with DFBs strategy of running a low net revenue margin in order to try to take significant market share, especially given that they are in the early stage of their life cycle and the spoils of becoming the DFB industry's leader with an early first-mover advantage are potentially invaluable. We used 4 times gross revenue as the benchmark for our valuation case study because this is the average multiple that has been assigned in recent funding rounds by venture capital (VC) investors into prominent DFBs. According to Pitchbook, the high end of valuations for DFBs are approaching 8 times gross revenue so using 4 times was a reasonable benchmark in our opinion.

First, to demonstrate why 4 times gross revenue is a difficult valuation to justify using a real world example, Coyote (the superstar growth broker of the last decade) sold to UPS for just 0.9 times gross revenue in 2015 (UPS paid $1.8 billion for Coyote compared to its $2.1 billion in gross revenue). Coyote was not a mature freight broker

at the time of its sale, having grown its gross revenue from essentially zero to over $2 billion in under 10 years since its founding. We would note that much of this growth was acquisition-driven, but we still see Coyote as a relevant comparison and think DFBs may have to roll-up traditional brokerages as well at some point. According to Pitchbook, Coyote also grew its gross revenue by 86 percent in 2014 (the year preceding its sale). We believe this is representative of the rapid growth currently seen by leading DFBs.

Below, we outline a simple example of a company with $100 in revenue that trades at 4 times gross revenue. The result is that the company in question then trades at 50 times net revenue and 200 times earnings assuming a mature margin structure with an 8 percent net revenue margin and a 25 percent net income margin on net revenue (equivalent to C.H. Robinson). If one assumes a low-single-digit take-rate (where we think DFBs are operating today), then the valuation rises sharply accordingly.

Figure 9: Why a Valuation of 4x Gross Revenue is Speculative

Example: Why 4x Gross Revenue is Speculative

	Market Cap	Gross Revenue	Net Revenue @ 8%	Net Income @ 25% Net Margin
Company XYZ	$400.0	$100.0	$8.0	$2.0

	Price-to-Gross Sales (P/S) Multiple	Price-to-Net Sales (P/S) Multiple	Price-to-Earnings (p/e) Multiple
Company XYZ	4.0x	50.0x	200.0x

For context of why this is expensive, a valuation of 50 times net revenue is meaningfully above the highest flying publicly traded Software-as-a-Service (SaaS) companies that are often growing revenues above 50 percent with very low churn and very high recurring revenue. SaaS companies often sport 80 percent gross margins (or higher) and are also capital-light, meaning they are able to generate exponential revenue growth on very little capital employed because their incremental margins are extremely high.

We believe SaaS business models are more attractive than the DFBs' current business models, primarily because we would argue that freight brokerage is a highly competitive industry that mostly competes on price with little differentiation or competitive moats. Therefore, we believe DFBs trading at 4 times gross revenue is speculative and will be difficult, but not impossible, valuations to grow into. A great deal just has to go right.

Figure 10: Current Publicly Traded Software-as-a-Service (SaaS) Company Valuations

Company / Ticker	Recent Price	YTD Change	Market Value (bil)	2019E EPS (GAAP)	2019E Revenue Growth	2019E Price/S
Zoom Video Communications / ZM 1	$97.11	170%	$26.5	-$0.15	65%	48.5
Okta / OKTA 1	136.62	114	15.6	-1.50	37	28.5
Slack Technologies / WORK 1	33.72	30	17.0	-1.36	51	28.1
Zscaler / ZS 2	86.42	120	10.9	-0.07	34	27
Shopify / SHOP	333.34	141	37.4	-0.81	41	24.7
Atlassian / TEAM 3	134.51	51	32.4	-0.14	28	20.9
Twilio / TWLO	147.76	65	19.8	-1.79	71	17.9
ServiceNow / NOW	285.73	60	53.0	0.05	33	15.3
Adobe / ADBE 4	308.73	36	149.9	5.78	24	13.4
Workday / WDAY 1	215.01	35	48.6	-2.12	29	13.4
Microsoft / MSFT 3	140.19	38	1,071.5	5.22	11	7.7
Salesforce.com / CRM 1	159.35	16	123.5	0.79	23	7.6

1 Fiscal year ends Jan. 2020; 2 Fiscal year ends July 2020; 3 Fiscal year ends June 2020; 4 Fiscal year ends Nov. 2019; E=Estimate; Slack YTD change from 6/19/19; Zoom Video YTD chnage from 4/17/19

Source: Bloomberg

Source: Barron's

Lastly, we demonstrate in Figure 11 below that a company trading at 4 times gross revenue would need to grow its gross revenue, net revenue and net income by 11.8 times (or 1,080 percent) to reach the stock market's current and historical average price-to-earnings multiple of 17 times (as measured by the S&P 500). A multiple of 4.3 times net revenue and 17 times earnings also happens to be the exact same multiples being awarded to C.H. Robinson in the market today, which is a direct comparable and demonstrates what investors are willing to pay for a best-in-class mature freight brokerage.

In the scenario below, the market capitalization is unchanged from the prior example; however, hypothetically investors would only break even and not earn a return despite an almost 12-fold increase in growth due to the extreme valuation compression.

Figure 11: Rate of Growth Needed for DFBs Assuming Valuation Multiples at Maturity Compress to Parity with the S&P 500 and C.H. Robinson

Example: Growth Needed to Reach CHRW's and S&P 500's 17x p/e multiple				
	Market Cap	Gross Revenue	Net Revenue @ 8%	Net Income @ 25% Net Margin
Company XYZ	$400.0	$1,175.0	$94.0	$23.5
Increase in Growth Needed		11.8x	11.8x	11.8x

	Price-to-Gross Sales (P/S) Multiple	Price-to-Net Sales (P/S) Multiple	Price-to-Earnings (p/e) Multiple
Company XYZ	0.3x	4.3x	17.0x

We Are Not Making A Call On DFBs' Valuations But Empirical History Suggest Maintaining Current Valuation Multiples Will Be Difficult

We are not forecasting a compression in the valuation multiples of DFBs. We simply would point out that the margin of safety for current DFB valuations appears low as they do not appear to leave much room for error in execution.

The former example is entirely theoretical because it assumes a terminal valuation equal to the S&P 500's price-to-earnings multiple. The actual returns for DFB investors all depends on the valuation multiples that they are able to sustain over time.

In fact, there are many (mostly technology) companies that have managed to not trade anywhere near typical, historical average valuation multiples for many years that have turned out to be outstanding investments (i.e. Amazon, Netflix, Uber and so on). Nonetheless, we would note that even Amazon is now down to an enterprise value to earnings before interest, taxes, depreciation, and amortization (EV/EBITDA) multiple of 18 times and has a 4 percent free cash flow yield, so the market almost always eventually values a company on profitability as it starts to mature.

Regardless of industry, geography or growth stage, we believe that a multiple of 4 times gross revenue is speculative. Empirically, there are very few (if any) companies that have been able to consistently garner and maintain this high of a valuation multiple. Philosophically, we do not understand the logic of valuing companies in this manner.

For example, if this were a normally accepted practice, companies like Alibaba could trade at many multiples of its $1 trillion in gross merchandise value (GMV) sold across its platforms. Visa and Mastercard could trade at multiples of the trillions in gross payment volumes crossing their global networks. There are countless other examples.

We are skeptical of why freight would be any different. After all, no matter the industry, a company's revenue is a function of the cut it takes on any transaction or what it charges for the goods and services it sells.

If DFBs Can Sustain Their 4 Times Gross Revenue Valuations, Then J.B. Hunt Appears Substantially Undervalued on a Sum-of-the-Parts (SOTP) Basis

J.B. Hunt (JBHT) has its own DFB app called "360." 360 is reportedly already at a $1 billion run-rate as of the end of May 2019. This $1 billion run-rate would place 360 at (or near) the top of the DFB peer set in terms of size. As of the second quarter of 2019, 360 represented 67 percent of JBHT's Integrated Capacity Solutions (ICS) segment revenue according to the company's press release. This is up from about 30 percent a year ago.

If one values J.B. Hunt 360 at a VC-backed DFB peer multiple of 4 times gross revenue of $1 billion (or $4 billion), JBHT's valuation for the legacy, core operations drops considerably. Using Goldman Sachs' estimates for 2019 and 2020 EBITDA and earnings per share (EPS), and then backing out 360 at a $4 billion valuation, JBHT's EV/EBITDA multiple for 2019 decreases from 9.4 times to 6.4 times. JBHT's 2019 price-to-earnings (p/e) multiple decreases from 18.7 times to 12.0 times; the latter represents a 43 percent discount to its five-year average forward p/e multiple of 21 times.

We will leave the proper valuation for DFBs up to the market. However, should the premium valuation multiples for DFBs persist, it appears that J.B. Hunt is substantially undervalued on a sum-of-the-parts (SOTP) basis given the company is operating a leading DFB operation inside of a traditional freight brokerage.

Assuming a $4 billion valuation for 360 and further assuming that the core, legacy operations trade at the five-year average forward p/e multiple of 21 times, J.B. Hunt is worth over $150 per share (see Figure 12 below). This would imply 50 percent in immediate upside compared to today's price.

Figure 12: J.B. Hunt (JBHT) Sum-of-the-Parts (SOTP) Valuation

JB Hunt (JBHT) Sum-of-the-Parts Valuation		
Stock Price	$102.00	
Market Capitalization ($B)	$11.1	
Net Debt ($B; 2Q19A)	$1.4	
Enterprise Value ($B)	$12.4	
Diluted Shares Outstanding	108.5	$106.7
	2019e	**2020e**
EBITDA ($B) - Goldman Sachs	$1.320	$1.416
Diluted EPS - Goldman Sachs	$5.45	$6.15
EV/EBITDA	9.4x	8.8x
p/e	18.7x	16.6x
360 Gross Revenue ($B)	$1.000	$1.150
360 Net Revenue @ 15% Margin	$0.150	$0.173
360 EBITDA (assumes break-even)	$0.000	$0.000
360 Value ($B) @ DFB Peer Group 4x Gross Revenue	**$4.000**	**$4.600**
Market Capitalization ($B)	$11.067	$11.067
Less 360 @ 4x Gross Revenue	-$4.000	-$4.600
Core JBHT Market Capitalization ex-360	**$7.067**	**$6.467**
Net Debt (2Q19A)	$1.365	$1.365
Core JBHT Enterprise Value ($B) ex-360	**$8.432**	**$7.832**
Core JBHT Valuation ex-360	**2019e**	**2020e**
EV/EBITDA	6.4x	5.5x
Forward p/e	12.0x	9.9x