

COMPANY UPDATE Apple Inc. (AAPL)

Buy

Equity Research

Switching from the iPhone to Android: how hard can it be?

What's changed

Over the past several years we have written extensively on our view that Apple's iOS customers are remarkably loyal, with high switching costs; moreover, our view has been that these switching costs provided a baseline level of support for the company's profits, cash flow and valuation. In order to more deeply understand this dynamic at a micro level and the potential risks to the Apple story, we switched a real iPhone user to a Samsung Galaxy S4 smartphone to see how costly and difficult it really is. This report explores that process, in detail, and further refines our view of switching costs.

Implications

Our conclusion suggests the cost of switching platforms is significant, and indeed, it was not possible to transfer all of our content. The explicit switching costs of our switch totaled \$79.85. While that is substantial in its own right, our inability to transfer 13% of our apps or any of our iTunes-purchased movies and TV shows was not included in our calculation; this coupled with the significant amount of time required to complete the switch added to implicit switching costs that exceeded the explicit figure. Overall, we believe Apple's installed base loyalty clearly differentiates it from traditional IT hardware companies, though the company's ability to attract new consumers with new products remains the core of the long-term story.

Valuation

We maintain our Buy rating and 12-month target price of \$500. Our target price is based on a P/E multiple of 13X on our CY2013 EPS estimate of \$37.93. By comparison, Apple is currently trading at a CY2013E P/E multiple of 11X (7X on an ex-cash basis).

Key risks

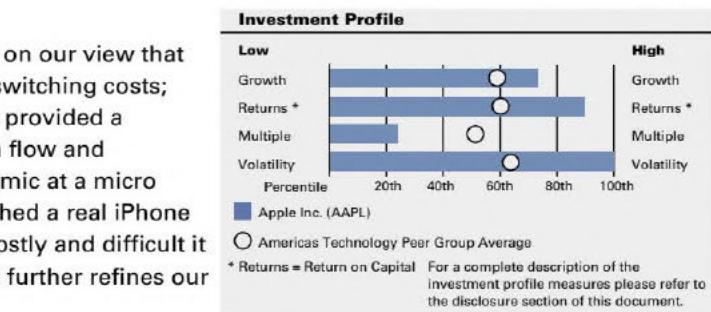
Key risks to our view include delayed product cycles, supply chain difficulties, product price erosion, and a slower pace of product innovation.

INVESTMENT LIST MEMBERSHIP

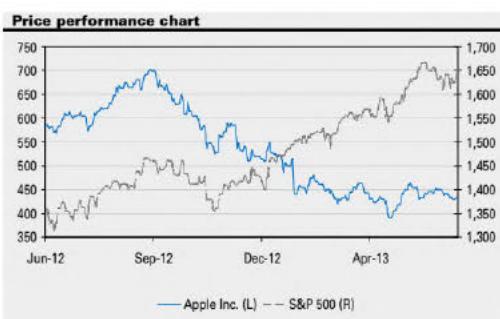
Americas Buy List
GS SUSTAIN Focus List

Coverage View: Cautious

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	Current
Price (\$)	431.77
12 month price target (\$)	500.00
Market cap (\$ mn)	405,904.4
Dividend yield (%)	2.6
Net margin (%)	21.5
Debt/total capital (%)	11.2
Revenue (\$ mn)	156,508.0
EPS (\$)	44.14
P/E (X)	12.0
EVEBITDA (X)	8.3
ROE (%)	42.8
3/13	9/13E
EPS (\$)	10.09
6/13E	9/13E
	12/13E
	13.34



Share price performance (%)	3 month	6 month	12 month
Absolute	(5.3)	(19.1)	(26.3)
Rel. to S&P 500	(11.0)	(29.2)	(40.0)

Source: Company data, Goldman Sachs Research estimates, FactSet. Price as of 6/18/2013 close.

Apple Inc.: Summary Financials

Profit model (\$ mn)	9/12	9/13E	9/14E	9/15E	Balance sheet (\$ mn)	9/12	9/13E	9/14E	9/15E
Total revenue	156,508.0	168,543.7	179,274.5	200,105.1	Cash & equivalents	10,746.0	13,922.7	12,099.4	10,289.3
Cost of goods sold	(87,846.0)	(105,523.7)	(113,577.0)	(127,731.1)	Accounts receivable	10,930.0	7,354.0	8,347.4	9,300.3
SG&A	(10,040.0)	(11,111.0)	(12,272.7)	(12,920.8)	Inventory	791.0	1,498.6	1,578.8	1,770.6
R&D	(3,381.0)	(4,277.0)	(4,543.1)	(4,938.0)	Other current assets	16,803.0	16,953.0	17,639.4	17,866.3
Other operating profit/(expense)	0.0	0.0	0.0	0.0	Total current assets	39,270.0	39,728.3	39,665.1	39,226.5
ESO expense	--	--	--	--	Net PP&E	15,452.0	15,897.2	17,817.6	19,851.4
EBITDA	58,518.0	53,588.0	54,774.4	61,086.8	Net intangibles	10,837.0	12,032.1	12,151.2	12,271.5
Depreciation & amortization	(3,277.0)	(5,955.9)	(5,892.7)	(6,571.7)	Total investments	110,505.0	149,085.3	162,225.2	177,770.8
EBIT	55,241.0	47,632.1	48,881.7	54,515.1	Other long-term assets	0.0	0.0	0.0	0.0
Net interest income/(expense)	522.0	1,279.1	964.9	1,056.9	Total assets	176,064.0	216,542.9	231,859.1	249,120.2
Income/(loss) from associates	0.0	0.0	0.0	0.0	Accounts payable	21,175.0	20,200.7	24,179.6	27,117.4
Others	0.0	0.0	0.0	0.0	Short-term debt	0.0	0.0	0.0	2,500.0
Pretax profits	55,763.0	48,911.2	49,846.7	55,572.0	Other current liabilities	17,367.0	18,302.0	20,428.7	22,793.0
Provision for taxes	(14,030.0)	(12,718.9)	(12,461.7)	(13,893.0)	Total current liabilities	38,542.0	38,502.6	44,608.3	52,410.5
Minority interest	0.0	0.0	0.0	0.0	Long-term debt	0.0	17,000.0	17,000.0	14,500.0
Net income pre-preferred dividends	41,733.0	36,192.3	37,385.0	41,679.0	Other long-term liabilities	19,312.0	26,793.3	29,809.9	31,082.5
Preferred dividends	0.0	0.0	0.0	0.0	Total long-term liabilities	19,312.0	43,793.3	46,609.9	45,582.5
Net income (pre-exceptional)	41,733.0	36,192.3	37,385.0	41,679.0	Total liabilities	57,854.0	82,295.9	91,218.2	97,993.0
Post tax exceptionals	0.0	0.0	0.0	0.0	Preferred shares	0.0	0.0	0.0	0.0
Net income (post-exceptional)	41,733.0	36,192.3	37,385.0	41,679.0	Total common equity	118,210.0	134,246.9	140,640.9	151,127.3
EPS (basic, pre-except) (\$)	44.64	38.72	41.57	48.19	Minority interest	0.0	0.0	0.0	0.0
EPS (diluted, pre-except) (\$)	44.14	38.45	41.30	47.86	Total liabilities & equity	176,064.0	216,542.9	231,859.1	249,120.2
EPS (basic, post-except) (\$)	44.64	38.72	41.57	48.19					
EPS (diluted, post-except) (\$)	44.14	38.45	41.30	47.86					
Common dividends paid	--	--	--	--					
DPS (\$)	2.65	11.40	12.81	14.09					
Dividend payout ratio (%)	5.9	29.4	30.8	29.2					
Growth & margins (%)	9/12	9/13E	9/14E	9/15E					
Sales growth	44.6	7.7	6.4	11.6					
EBITDA growth	64.4	(8.4)	2.2	11.5					
EBIT growth	63.5	(13.8)	2.6	11.5					
Net income (pre-except) growth	61.0	(13.3)	3.3	11.5					
EPS growth	59.2	(13.3)	7.4	15.9					
Gross margin	43.9	37.4	36.6	36.2					
EBITDA margin	37.4	31.8	30.6	30.5					
EBIT margin	35.3	28.3	27.3	27.2					
Cash flow statement (\$ mn)	9/12	9/13E	9/14E	9/15E					
Net income	41,733.0	36,192.3	37,385.0	41,679.0					
D&A add-back (incl. ESO)	3,277.0	5,955.9	5,892.7	6,571.7					
Minority interest add-back	0.0	0.0	0.0	0.0					
Net (inc)/dec working capital	1,084.0	2,679.0	4,345.6	3,930.6					
Other operating cash flow	4,762.0	12,425.0	5,410.0	4,576.3					
Cash flow from operations	50,856.0	57,252.2	53,033.3	56,757.6					
Capital expenditures	(8,295.0)	(8,903.9)	(9,501.6)	(10,605.6)					
Acquisitions	(1,457.0)	(1,340.0)	(1,224.0)	(1,224.0)					
Divestitures	0.0	0.0	0.0	0.0					
Others	(38,475.0)	(39,276.3)	(13,140.0)	(15,545.6)					
Cash flow from investing	(48,227.0)	(49,520.2)	(23,865.5)	(27,375.2)					
Dividends paid (common & pref)	(2,488.0)	(10,694.3)	(11,591.0)	(12,265.6)					
Inc/(dec) in debt	0.0	17,000.0	0.0	0.0					
Other financing cash flows	790.0	(10,861.0)	(19,400.0)	(18,927.0)					
Cash flow from financing	(1,698.0)	(4,555.3)	(30,991.0)	(31,192.6)					
Total cash flow	931.0	3,176.7	(1,823.2)	(1,810.2)					
Note: Last actual year may include reported and estimated data.									
Source: Company data, Goldman Sachs Research estimates.									

Analyst Contributors

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Switching from the iPhone to Android: how hard can it be?

Over the past several years we have written extensively on our view that Apple's iOS customers are remarkably loyal, with high switching costs; moreover, our view has been that these switching costs provided a baseline level of support for the company's profits, cash flow and valuation that few other consumer electronics companies have enjoyed in the past. In order to support this argument, we have conducted several consumer surveys in the US and China (see page 14 for a list of related reports), and the data has generally favored our thesis. Nevertheless, in order to more deeply understand this dynamic at a micro level and the potential risks to the Apple story, we switched a real iPhone user to a Samsung Galaxy S4 smartphone to see how costly and difficult it really is. Our conclusions are as follows:

- **Explicit switching costs were \$79.85.** Excluding the costs to replace our library of movies and TV shows, as well as the songs that failed to shed DRM through iTunes Match, our total switching costs added up to \$79.85: including \$24.99 for a subscription to iTunes Match, \$4.99 for the paid version of a music management app, and \$49.87 for paid replica apps.
- **But we could not transfer any of our movies or TV shows and 13% of our apps.** iTunes Match was able to strip DRM (digital rights management) from the majority of our music library, but there is no legal (Apple and content provider sanctioned) way to strip Apple's DRM from movies or TV shows. For our apps, most were available in Android format, but for now, some apps are still iOS-only. As a result, a portion of our overall content could not be moved to our Samsung smartphone. We did not include this in our explicit switching costs figure mentioned above.
- **Dual platform support likely necessary for most switchers.** In order to continue to use our TV and movie collection, as well as the songs that remained DRM protected on iTunes, we would need to keep an active iTunes account, and an Apple-supported consumption device (iPad, Apple TV, Mac, etc.). As such, for users with iTunes TV and movie content, a switch would necessitate the use of two platforms going forward. This is something our prior surveys have suggested most users would not do (see *Americas: Technology: Clash of the Titans: Vol. 2*, February 27, 2013).
- **iCloud is not easily replicated when a user uses two platforms.** One of the current benefits of iCloud is that it can seamlessly sync a user's content across multiple Apple devices (Mac, iPod, iPhone, iPad and Apple TV). If a user switches to an Android smartphone, this device cannot tie into iCloud and this seamless syncing capability is lost. As users of iCloud syncing, this is one of the most important challenges we faced in our switching experiment.
- **In our case, implicit switching costs exceed explicit switching costs.** The \$79.85 figure represents what we would define as "explicit" switching costs, while the raw time and "pain in the neck" factor of the switch would represent incremental "implicit" switching costs. Coupling this with the content that we could not transfer in this switch, we would argue the implicit switching costs easily outweigh the explicit switching costs. Indeed, the entire switch took us nearly three weeks (though we did most of the work in the evenings and on weekends, outside of normal business hours), and if this wasn't meant for a research report, we would have abandoned the effort all together at several times during the process. This fits with our survey-based results from mid-2012 that suggested US iPad and iPhone users required an average device discount of 49% to switch platforms.

Overall, this analysis supported our prior survey-based research, and it suggests switching costs remain a key driver for the loyalty of the iOS installed base. With these types of analyses, we're often asked what this means for the story. Our sense is that switching costs should be seen as protective moat for Apple's installed base that provides a baseline of cash flow and profit that is partially independent of new user growth. This baseline becomes particularly critical in periods where Apple's products are generating less new user growth and market share than expected, and we believe the recent iPhone 5 product cycle has been such a period. Nevertheless, as has become apparent over the past year, new user growth is critical for the stock price and earnings growth. Furthermore, while Apple's sticky installed base can withstand a few underwhelming product cycles, we suspect even the most loyal users could consider abandoning the platform if they are no longer satisfied with the products. In addition, if gross margins for smartphones and tablets came under intense commoditization pressure, the replacement profits from the iOS installed base would be substantially compressed (even with hefty switching costs). As such, we believe Apple's installed base loyalty clearly differentiates it from traditional IT hardware companies, but the company's ability to excite consumers with new products remains the core of the story. On this front, we remain optimistic that Apple's product refreshes this fall and in 2014 will begin to reinvigorate the company's momentum.

We maintain our Buy rating and 12-month target price of \$500. Our target price is based on a P/E multiple of 13X on our CY2013 EPS estimate of \$37.93. By comparison, Apple is currently trading at a CY2013E P/E multiple of 11X (7X on an ex-cash basis). Key risks to our view include delayed product cycles, supply chain difficulties, product price erosion, and a slower pace of product innovation.

The methodology

We purchased a Samsung Galaxy S4 smartphone through Verizon and converted a long-time iPhone user (the lead author of this report). Our goal was to replicate the content on the user's iPhone, including apps, music, video, photos, contacts, and the calendar, as closely as possible. In cases where this required a fee, we paid it and counted this as a switching cost. In instances where DRM was a hurdle, we used only processes and apps that were supported and provided by Apple and the content providers (i.e., iTunes Match). The internet is filled with many other DRM removal tools, but in most cases the legality of these tools was either in question or unverifiable, so we did not use them.

As a reminder, this is a discussion of one user's attempt to shift from an iPhone to a Samsung Galaxy S4, and this is not a broad survey. As such, some users will find their switching experience and costs differ significantly from what we discuss, and some may choose different apps and processes for switching platforms.

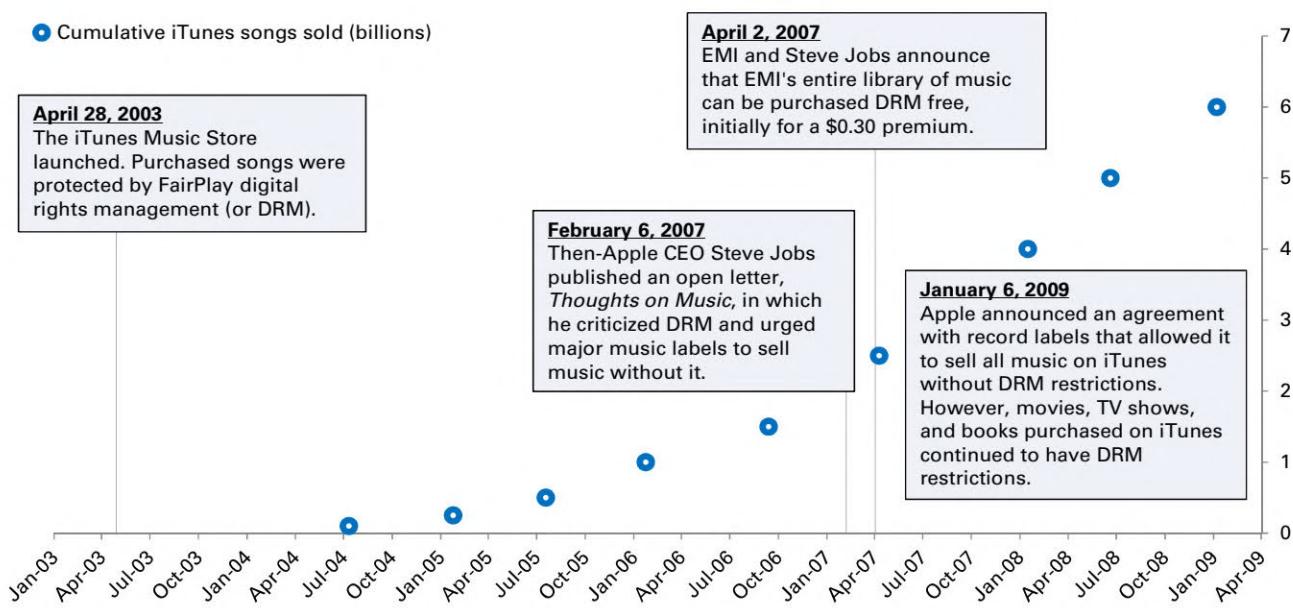
Moving the music: iTunes Match strips DRM, but it can be tedious

Perhaps the most important component of an individual's smartphone is the music collection. Indeed, part of Apple's early success with the iPhone can be attributed to the legions of loyal iPod users that were eager to port their music libraries to their phones. In our test case, the existing iTunes library held 3,954 songs, nearly half of which were purchased from the iTunes music store over the past decade. The initial useable capacity on our 16GB Samsung Galaxy S4 device clearly wouldn't be able to hold all of our media and apps, so to fully execute the transfer we added a Samsung 64GB memory card to the device (we don't count this as a switching cost, as we recognize not all content needs to be stored locally). After that, we began the process of making sure our library was transferrable to our S4.

Converting the library

For many years, it was nearly impossible to move music that was purchased from iTunes to a non-Apple device, and it was certainly not legal. This was because iTunes music files were protected by FairPlay DRM (digital rights management). This software was released by Apple in 2003 with the launch of the iTunes Music Store and it was meant to minimize online piracy risks at a time when free music file sharing sites were gaining popularity and the music labels were reluctant to support any online sales model for their content. This DRM-centric model began to change on February 6, 2007, when Steve Jobs published an open letter entitled, "Thoughts on Music." In this letter he argued that music labels should release their music without DRM protection, since in the end, it encourages users to obtain unrestricted illegal music online. On April 2, 2007, EMI announced that it would offer DRM-free versions of its entire music library (for a \$0.30 premium at the time), and by 2009 the remainder of the iTunes music collection was available in DRM-free format as well. From this point onward, any music purchased from iTunes was DRM-free and users could freely transport it to non-Apple devices.

Exhibit 1: The history of iTunes DRM (digital rights management)



Source: Company data and press releases.

At first glance, this would suggest that the cost of shifting iTunes music from an iPhone to an Android device is now zero. Unfortunately, this is not the case. First, any music that was purchased from iTunes prior to 2009 is still protected, so these files must be converted before any transfer can take place. For some time, this required users to upgrade previously purchased songs to iTunes Plus format, one-by-one and initially at an incremental cost of \$0.30 per song. With the advent of iTunes Match, however, this process should be somewhat easier.

In order to remove pre-2009 DRM from our music with iTunes Match, we did the following: (1) purchased an iTunes Match subscription for \$24.99; (2) uploaded our library to iTunes Match (Exhibit 2); (3) determined which files were protected AAC files by sorting the library by "kind" (Exhibit 3); (4) deleted the protected files from the library (required per Apple's support site), and (5) then re-downloaded the previously deleted files from iCloud. This

sounds fairly straightforward, but this process was interrupted several times by an error message that read "This item is temporarily unavailable. Try again later," which forced us to restart iTunes and begin the process anew. This may have been a rare iTunes malfunction, but it did add time and frustration to the process all the same. Eventually the process was complete, and all of our music was back in our library, locally stored.

Exhibit 2: We uploaded our music library to iTunes Match after purchasing a one-year subscription

Source: Apple Inc.

Exhibit 3: To determine which files are protected AAC files, sort the library by "kind"

Genre	Rating	Plays	Kind
Rock			Protected AAC audio file
Rock			Protected AAC audio file
Rock		2	Protected AAC audio file
Rock			Protected AAC audio file
Rock			Protected AAC audio file
Rock		2	Protected AAC audio file
Rock			Protected AAC audio file
Rock			Protected AAC audio file
Rock		1	Protected AAC audio file
Rock		2	Protected AAC audio file
Rock		3	Protected AAC audio file
Rock		1	Protected AAC audio file
Rock			Protected AAC audio file

Source: Apple Inc.

At this point, we assumed we had removed all the DRM from our music collection and were free to transfer songs at will. Just to make sure, we again sorted the files by "kind" and hoped to see the "matched AAC file" label next to the songs we had initially deleted.

Unfortunately, 405 songs still showed up as "Protected AAC audio files." We assumed we had made a mistake, so we repeated the delete and re-download process...three more times. That didn't work. At this point, we began to scour Apple's support site, and under the topic, iTunes Store: iTunes Plus Frequently Asked Questions (FAQ), 12/5/2012, we found the following: "The reason that certain music and music videos are not offered in our DRM-free, highest quality audio format is because they have not been provided in iTunes Plus format from the music label." This seems logical and since the major labels all support DRM-free music, it would presumably only impact a small amount of any user's legacy iTunes library. This wasn't true in our case though, as it impacted nearly 10% of our music collection, many of which were from mainstream labels. If we were to repurchase all of these songs through iTunes or Android, it could easily add over \$400 to our switching costs, so this is clearly a key hurdle to any would-be iOS defector. We weren't satisfied with assuming switching costs could be this high, so we attempted the conversion process several more times, over several days.

Exhibit 4: Definition of the "iTunes Plus format"**Definition of iTunes Plus**

- Songs and music videos with no digital rights management (DRM)
- Twice the audio quality (256 kbps AAC encoding) of DRM-protected music
- Can be synced to any AAC-compatible device
- Can be played on any Mac or PC
- Can be burned to a CD an unlimited number of times

Source: Apple Inc.

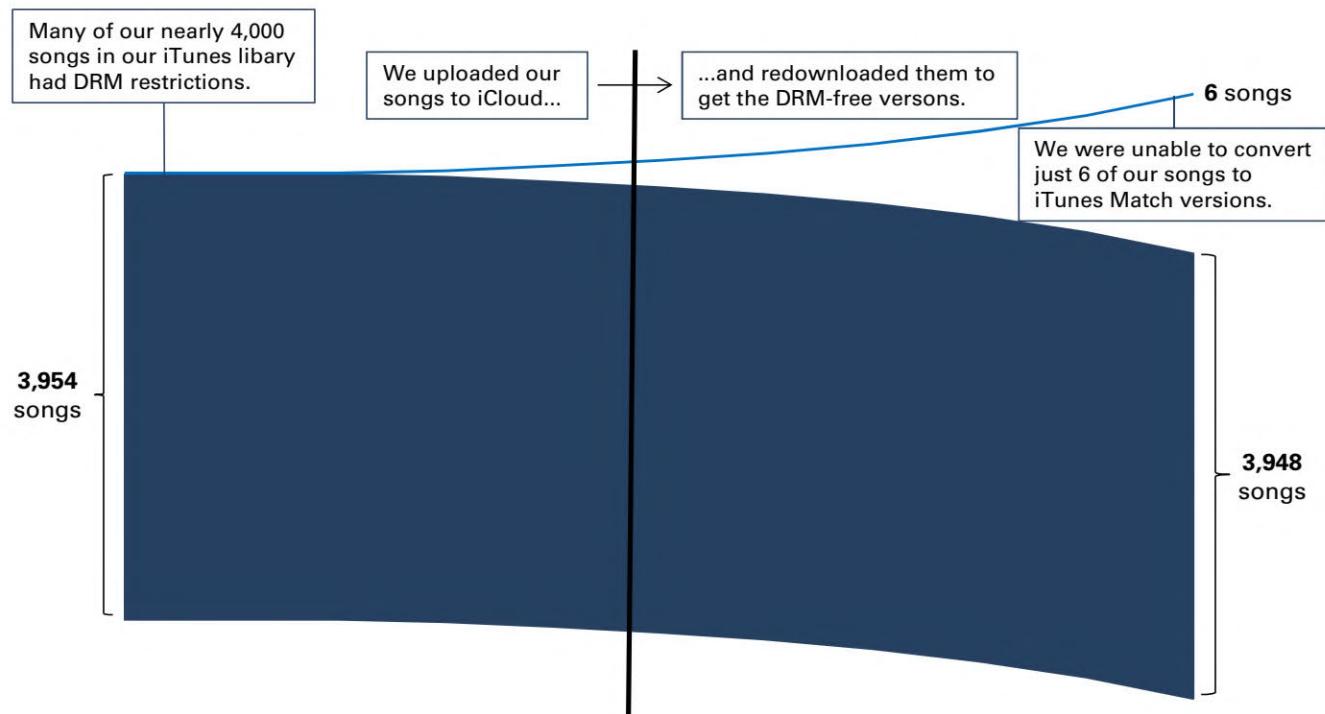
We attempted it on a different computer, and we even tried to manually rename the files with a DRM-free file type. Eventually, we contacted Apple support to see if they may have a solution. In our discussions with Apple support we were told that it wasn't possible to remove DRM from certain songs for the following reasons: (1) iTunes could not match certain old songs that are no longer available in the iTunes Store and therefore are not available in iTunes Match today, and (2) certain songs may not have met the quality criteria necessary for uploading to iCloud. This makes sense, but it shouldn't apply to over 400 of our songs. Finally, we decided to start from scratch: we de-authorized then re-authorized our Mac on iTunes, then we repeated the iTunes Match upload and download process. That did the trick, and we were able to strip DRM from 399 more songs (Exhibit 5). All in, all but six songs were now transferrable to an Android device, but the process was very tedious to complete (Exhibit 6).

Exhibit 5: After de-authorizing and then re-authorizing our Mac on iTunes, we repeated the process and were able to strip DRM from 399 more songs

R&B/Soul	Matched AAC audio file
R&B/Soul	Matched AAC audio file
Rock	Matched AAC audio file

Source: Apple Inc.

Exhibit 6: Of the 3,954 songs in our iTunes library, we were able to remove DRM from all but 6 of them



Source: Goldman Sachs Research.

Downloading a music file manager

Once we had downloaded our music and attempted to remove DRM from as many files as possible, it was time to choose a music management app. There are many options here, but we chose doubleTwist since it seemed to have relatively high ratings on the Android store. The base app is free, but we also chose to purchase the AirSync option for \$4.99 so we could wirelessly update our music library in the future (more closely emulating our experience with our iPhone previously). By downloading doubleTwist on both our smartphone and our Mac, the doubleTwist library automatically updates its files for newly purchased iTunes songs and newly created playlists. For users that are maintaining an iTunes account (to continue to support an iPad or iPod touch) while using an Android smartphone, this makes the process easier. This was a fairly easy part of the transition, and for the DRM-free portion of our library, the integration between iTunes and our Samsung Galaxy S4 (with doubleTwist as an intermediary) was seamless.

Overall, shifting music from iTunes to an Android device was not as easy as we anticipated, but we eventually completed the process for nearly all of our collection. With that said, for users that are relatively new to online music (after 2009) and users that primarily use streaming music services, DRM is not an issue and transferring an iTunes music collection to an Android device should be less challenging than our experience suggested. Unfortunately, you don't know until you try, and our experience was an unpleasant surprise on many levels.

Exhibit 7: Steps to converting iTunes music library to an Android device

A number of steps are required to transfer pre-2009 iTunes music (DRM protected) to an Android device:

- 1.** Connect to iCloud
- 2.** Purchase an iTunes match subscription (\$24.99/yr)
- 3.** Upload library to iTunes Match
- 4.** Delete local copies of protected files (or entire library)
- 5.** Go to "purchased music" in iTunes
- 6.** Select "download all"
- 7.** Download/purchase an Android media manager app
- 8.** Convert

Source: Compiled by Goldman Sachs Research.

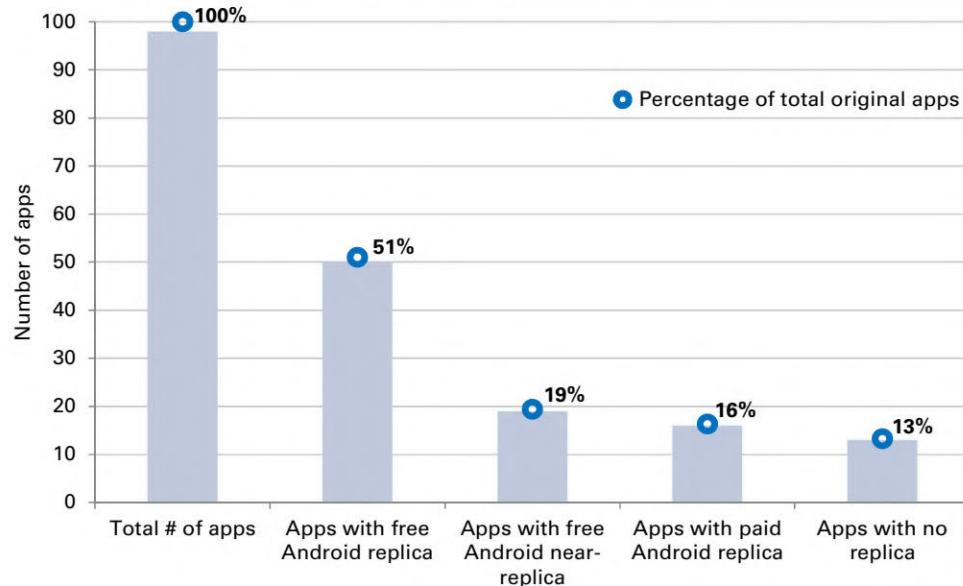
Moving the apps: relatively painless, with some necessary costs

As with any shift to a new computing platform, the ability to migrate applications is usually top of mind. For mobile platforms (particularly Android and iOS) this issue is less challenging than what PC users faced with Windows' dominant share of developer activity over the past three decades; mobile apps tend to be more bite sized and many of them now support both Android and iOS from the start. That said, even if an app is written for both iOS and Android, an app on iOS cannot be transferred to Android and vice versa – the user must re-download the app in the appropriate format. If it's a free app, this isn't a problem, but if it's a paid app, that adds switching costs.

Our iPhone had 98 apps on it. For each app, we looked for an Android version on the Google Play app that came with our S4. If the exact app was available, we downloaded it. If it was a paid app, we paid the fee, but we attempted to find free versions of the app whenever possible. If an exact replica of the app was not available, we searched for an app that was substantially similar and free, and we downloaded that version. In some cases, no replica was available (free or paid). As outlined in Exhibit 8, 51% of our apps were free and

replicable, and we found paid replicas for 16% of our apps. Moreover, we found free “near-replicas” for 19% of our apps. All in, we were able to essentially replace 87% of our app library, at a cost of \$49.87. It is worth noting, however, that 13% of our app library was not replicable as we could find no clear substitute in Android format. With the number of Android apps growing rapidly, we assume replacements for some of these apps will eventually emerge. But we assume some of the library will simply be lost.

Exhibit 8: Of the apps the iPhone had, 51% were freely replicated, and all but 13% could be replicated either through paid apps or near-replicas
Number of original iOS apps and number of Android replica apps



Source: Goldman Sachs Research.

Moving photos, contacts and calendars: an easy process

We found the transfer of our photos, contacts and calendar info to be inconsequential to the switching process. Photos are unprotected content and can be transferred directly to an Android device or used through a media manager (doubleTwist again, in our case). For contacts and our personal calendar, we were users of Gmail, so this was also seamless once we logged into our account on our S4. While some users may find it challenging to transfer their contacts and calendar entries if they had primarily used Apple’s proprietary apps, our understanding is that this is a fairly easy process that is outlined in many blogs on the internet. Many of the carriers and electronics retailers will also do this for users at the point of sale.

Moving TVs and movies: DRM restrictions remain substantial

The iTunes account used in this project has been active since 2003 and the user has downloaded many movies and TV shows over the years (primarily for the author’s

children), mostly through the legacy version of Apple TV. All in, there are 157 movies and 861 TV episodes in the library (Exhibits 9).

Exhibit 9: Our library had 157 movies and over 860 television episodes

All Episodes	861	11. What Does Blue Want to Do On a Rainy Day?	Blue's Clues
Recent Purchases	50	12. Blue's Surprise At Two O'Clock	Blue's Clues

Source: Apple Inc.

Every one of these files is protected by DRM, and as such, they can only be played on Apple devices (Exhibit 10). Unlike iTunes music, this DRM cannot be removed with an Apple-sanctioned application, and the content owners have not made DRM versions of iTunes movies or music available. There are applications on the internet that claim to be able to strip DRM from movies and TV shows, but it appears this violates both the terms of use on iTunes and federal law through the DMCA (Digital Millennium Copyright Act).

Exhibit 10: DRM restrictions are still substantial for movies and TV shows

Some iTunes purchases (including movies and TV shows) still have DRM restrictions:

- Playback is limited to a maximum of five authorized computers...
- ...but purchases can be synced with an iPod, iPhone, and/or iPad...
- ...and can be streamed to (or synced with) an Apple TV

Source: Apple Inc.

As a result, in our case, the only option is to keep these files for use on our iPad, Apple TV, and Macs. If we were to ever attempt to leave the Apple ecosystem entirely, this content would be lost and the replacement cost would run in the thousands of dollars. We don't count this as a switching cost in our analysis for two reasons: (1) we are only attempting to switch our smartphone, and we assume most users use their tablets and televisions for this type of video content, and (2) our movie and TV collection is much larger than that of the average user, so this would incorrectly distort any analysis of "normal" switching costs. Nevertheless, any user with a large iTunes television and movie library would find it difficult to leave the Apple ecosystem entirely, and would have to make the unenviable choice of managing two platforms.

What about iCloud?

One of the current benefits of iCloud is that it can seamlessly sync a user's content across multiple Apple devices (Mac, iPod, iPhone, iPad and Apple TV). If a user switches to an

Android smartphone, this device cannot tie into iCloud and this seamless syncing capability is lost. As happy users of iCloud syncing, this is one of the most important challenges we faced in our switching experiment, and it seems there really is no way around it. Nevertheless, there are some ways to partially mitigate the pain:

1. For music, syncing is possible. The doubleTwist app we downloaded earlier automatically updates its files and playlists for changes in the main iTunes library. So if you download a song on your iPad, it automatically appears in iCloud. Nevertheless, you have to then select that song in iTunes, download it to your Mac (or set up automatic downloads), and then it will transfer to doubleTwist. At that point, we were able to wirelessly download the song to our Android phone.
2. For photos, we have become accustomed to the Photo Stream feature on iCloud, where any photos we take on an iOS device automatically appear on other iOS devices attached to our iCloud account. This simply will no longer work with our Samsung phone. We were able to research some workarounds on the web, where for instance, the Automator feature on the Mac allows you to program a sequence that pulls new photos from a service like Dropbox that were taken by an Android device, exports them to iPhoto, and then Photo Stream sends that to your iCloud connected devices. For this to work, however, you need to leave your Mac powered on, keep it connected to the internet, and make sure the iPhoto app is open; it's hardly fully automated, and it seems too cumbersome to be worthwhile.

Since iCloud is a relatively new service from Apple (launched only two years ago) and it already has over 300 million users, this is becoming a critically important source of installed base loyalty over time. Most important, if Apple begins to improve the functionality and supported services on iCloud (including payments at some point), it may become the primary source of switching costs for the platform in short order.

So what does this tell us about switching costs and the installed base?

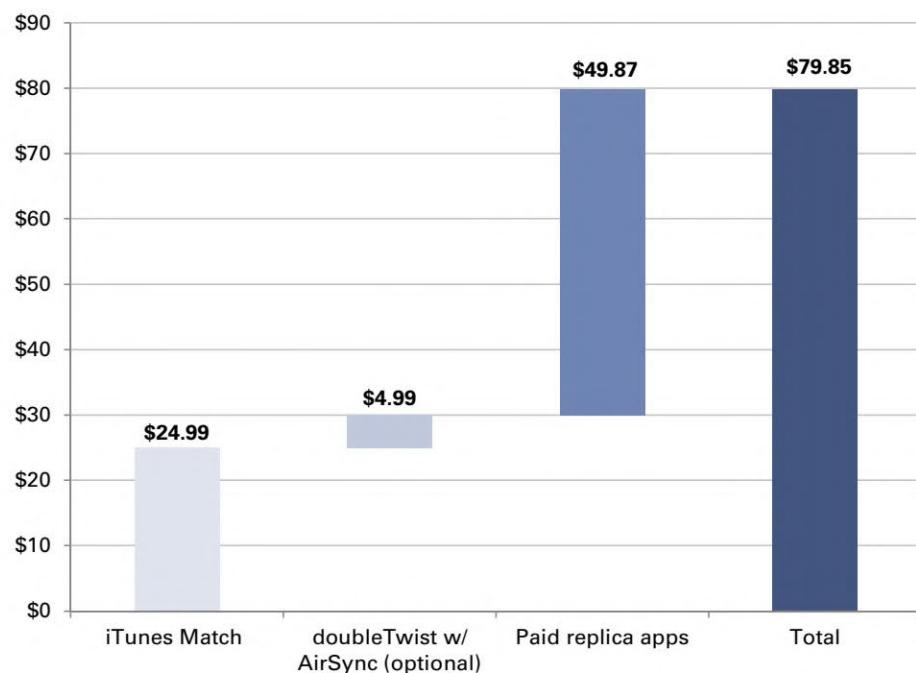
Excluding the costs to replace our library of movies and TV shows, as well as the handful of songs that failed to shed DRM through iTunes Match, our total switching costs added up to \$79.85: including \$24.99 for a subscription to iTunes Match, \$4.99 for the paid version of a music management app, and \$49.87 for paid replica apps (Exhibit 11). As for the cost of replacing TV shows and movies, that would add thousands of dollars in incremental costs; nevertheless, by keeping an iPad and Apple TV, we really aren't losing that content in this switch, and we believe it is unusual for most consumers to watch TV or movies on an iPhone.

The \$79.85 figure represents what we would define as "explicit" switching costs, while the raw time and "pain in the neck" factor of the switch would represent incremental "implicit" switching costs. In our experience with the switching process, we would argue the implicit switching costs easily outweigh the explicit switching costs. Indeed, the entire switch took us nearly three weeks (though we did most of the work in the evenings and on weekends, outside of normal business hours), and if this wasn't meant for a research report, we would have abandoned the effort all together at several times during the process. This fits with our survey-based results from mid-2012 that suggested US iPad and iPhone users required an average device discount of 49% to switch platforms; furthermore, our survey of Chinese consumers in late 2012, where iTunes-based media purchases are not available, noted that the average required discount is 27%. The latter survey would seem to capture "implicit" switching costs since the costs of replacing iTunes media would not be an issue. Either

way, it appears our surveys and this report suggest switching costs for iOS users remain substantial.

With that said, the switch would have been much easier for users that fall into the following categories: (1) users in regions like China that don't have access to the iTunes store for music, TV and movies; (2) users with a relatively small media library; (3) users that rely on non-Apple services for their media purchases; and (4) users that have only used iOS for a relatively short period of time. Nevertheless, given that Apple has sold over 25 billion iTunes songs and over 50 billion apps, we suspect there are still plenty of sources of lock-in across the installed base.

Exhibit 11: Explicit switching costs for our iOS to Android conversion added up to \$80
Explicit switching costs, excluding TV and Movies



Source: Compiled by Goldman Sachs Research.

Switching costs set a baseline, but new products drive growth and long-term loyalty

With these types of analyses, we're often asked what this means for the story. Our sense is that switching costs should be seen as protective moat for Apple's installed base that provides a baseline of cash flow and profit that is partially independent of new user growth. This baseline becomes particularly critical in periods where Apple's products are generating less new user growth and market share than expected, and we believe the recent iPhone 5 product cycle has been such a period. Nevertheless, as has become apparent over the past year, new user growth is critical for the stock price and earnings expansion. Furthermore, while Apple's sticky installed base can withstand a few underwhelming product cycles, we suspect even the most loyal users could consider abandoning the platform if they are no longer satisfied with the products. Furthermore, if gross margins for smartphones and tablets came under intense commoditization pressure, the replacement profits from the iOS installed base would be substantially compressed (even with hefty switching costs). As such, we believe Apple's installed base loyalty clearly

differentiates it from traditional IT hardware companies, but the company's ability to excite consumers with new products remains the core of the story.

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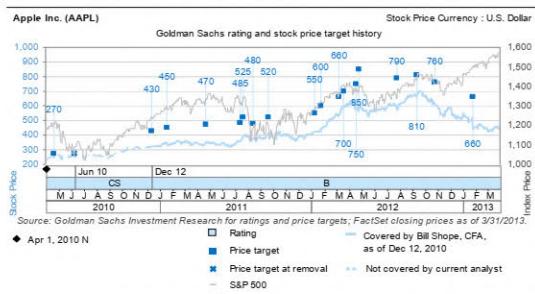
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