Abstract

In a discounted cash flow model, we consider the value of an asset to be the present value of the expected cash flows generated by that asset. In this document, we will first lay out the argument that financial service firms in the Dominican Republic should be valued on an equity basis, rather than as on a firm basis, and that dividends, for better or worse, are often the only tangible cash flow that we can observe or estimate. Consequently, our focus will be on variants of the dividend discount model and how they can best be used in valuing Banco Popular Dominicano.

Equity versus Firm Valuation

Lets first note the distinction between valuing a firm and valuing the equity in the firm. We value firms by discounting expected after tax cash flows prior to debt payments at the weighted average cost of capital. We value equity by discounting cash flows to equity investors at the cost of equity. Estimating cash flows prior to debt payments at a weighted average cost of capital is problematic, when debt and debt payments cannot be easily identified, which is the case with financial service firms in the Dominican Republic. Equity can be valued directly, however, by discounting cash flows to equity at the cost of equity. Consequently, we would argue for the latter approach for Banco Popular Dominicano.

Even with equity valuation, we have a secondary problem. To value the equity in a firm, we normally estimate the free cashflow to equity, defined as follows:

$$\textit{Free Cashflow to Equity} = \textit{Net Income} - \textit{Net Capital Expenditures} - \textit{Change in non-cash working capital} - (\textit{Debt repaid} - \textit{New debt issued})$$

If we cannot estimate net capital expenditures or non-cash working capital, we clearly cannot estimate the free cash flow to equity. Since this is the case with Banco Popular Dominicano, we have three choices. The first is to use dividends as cash flows to equity

and assume that firms over time pay out their free cash flows to equity as dividends. Since dividends are observable, we therefore do not have to confront the question of how much firms reinvest. The second is to adapt the free cashflow to equity measure to allow for the types of reinvestment that Banco Popular makes. For instance, given that banks operate under a regulatory capital ratio constraint, it can be argued that these firms have to increase regulatory capital in order to make more loans in the future. The third is to keep the focus on excess returns, rather than on earnings, dividends and growth rates, and to value these excess returns. In this document we will focus on the Dividend Discount Models.

Dividend Discount Models

In the basic dividend discount model, the value of Banco Popular is the present value of the expected dividends. While many analysts view the model as old fashioned, it retains a strong following among analysts who value financial service companies, because of the difficulties we face in estimating cash flows. In this section, we will begin by laying out the basic model and then consider ways in which we can streamline its usage, when valuing Banco Popular.

The standard model

If we start with the assumption that Banco Popular has an infinite life, we arrive at the most general version of the dividend discount model:

$$Value\ per\ share\ of\ Equity = \sum_{t=1}^{t=\infty} \frac{DPS_t}{(1+k_e)^t}$$

where

$DPS_t =$ Expected dividend per share in period t

$k_e =$ Cost of equity

In the special case where the expected growth rate in dividends is constant forever, this model collapses into the ***Gordon Growth model***.

$$Value\ per\ share\ of\ Equity = \frac{DPS_1}{(k_e - g)}$$

In this equation, g is the expected growth rate in perpetuity and *DPS1* is the expected dividends per share next year. In the more general case, where dividends are growing at a rate which is not expected to be sustainable or constant forever during a period (called the extraordinary growth period), we can still assume that the growth rate will be constant forever at some point in the future. This allows us to then estimate the value of a stock, in the dividend discount model, as the sum of the present values of the dividends over the extraordinary growth period and the present value of the terminal price, which itself is estimated using the *Gordon growth model*.

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$$Value\ per\ share\ of\ Equity\ in\ Extraordinary\ Growth = \sum_{t=1}^{t=n} \frac{DPS_t}{(1 + k_{e,hg})^t} + \frac{DPS_{n+1}}{(k_{e,st} - g_n)(1 + k_{e,hg})^n}$$

The extraordinary growth is expected to last *n* years, g_n is the expected growth rate after *n* years and k_e is the cost of equity (*hg*: high growth period and *st*: stable growth period).

While the dividend discount model is intuitive and has deep roots in equity valuation, there are dangers in using the model blindly. There may be some analysts who start with

the current dividends of the bank as a base, apply a growth rate to these earnings, based on either history or analyst forecasts, and compute a present value. For the model to yield a value that is reasonable, the assumptions have to be internally consistent, with the expected growth rate numbers jelling with the dividend forecasts and risk measures.

A Consistent Dividend Discount Model

Looking at the inputs into the dividend discount model, there are three sets of inputs that determine the value of equity. The first is the cost of equity that we use to discount cash flows, with the possibility that the cost may vary across time. The second is the proportion of the earnings that we assume will be paid out in dividends; this is the dividend payout ratio and higher payout ratios will translate into more dividends for any given level of earnings. The third is the expected growth rate in dividends over time, which will be a function of the earnings growth rate and the accompanying payout ratio. In addition to estimating each set of inputs well, we also need to ensure that the inputs are consistent with each other.

Risk and Cost of Equity

The cost of equity for a financial service firm in the Dominican Republic has to reflect the portion of the risk in the equity that cannot be diversified away by the marginal investor in Banco Popular.

Growth and Payout

There is an inherent trade off between dividends and growth. When a company pays a larger segment of its earnings as dividends, it is reinvesting less and should thus grow more slowly. With financial service firms, this link is reinforced by the fact that the activities of these firms are subject to regulatory capital constraints; banks and insurance companies have to maintain equity (in book value terms) at specified percentages of their activities. When a company is paying out more in dividends, it is retaining less in

earnings; the book value of equity increases by the retained earnings. In recent years, in keeping with a trend that is visible in other banks as well, Banco Popular have increased dividend payments as a way of returning cash to stockholders. To ensure that assumptions about dividends, earnings and growth are internally consistent, we have to bring in a measure of how well the retained equity is reinvested; the return on equity is the variable that ties together payout ratios and expected growth:

*Expected growth in earnings = Return on equity * (1 – Dividend Payout ratio)*

For instance, Popular Bank that payout out 93% of its earnings as dividends and earns a return on equity of 30% will have an expected growth rate in earnings of 2.0%. However, Banco Popular can deliver growth rates that deviate from this expectation, if the return on equity is changing.

$$Expected\ Growth_{EPS} = (1 - Payout\ Ratio)(ROE_{t+1})\frac{ROE_{t+1} - ROE_t}{ROE_t}$$

Thus, if Popular Bank is able to improve the return on equity on existing assets from 25% to 30%, the efficiency growth rate in that year will be 21.75%. However, efficiency growth is temporary and all firms ultimately will revert back to the fundamental growth relationship.

The linkage between return on equity, growth and dividends is therefore critical in determining value for Banco Popular Dominicano. At the risk of hyperbole in the Dominican Republic, the key number in valuing a bank is not dividends, earnings or growth rate, but what ***we believe it will earn as return on equity in the long term***. That number, in conjunction with payout ratios, will help in determining growth. Alternatively, the return on equity, together with expected growth rates, can be used to estimate dividends. This linkage is particularly useful, when we get to stable growth, where growth rates can be very different from the initial growth rates. To preserve consistency

in the valuation, the payout ratio that we use in stable growth, to estimate the terminal value, should be:

$$Payout\ ratio\ in\ stable\ growth = 1 - \frac{g}{ROE_{stable\ growth}}$$

The risk of Banco Popular should also adjust to reflect the stable growth assumption.

In the following table, we examined the effects of leaving dividends unchanged and using historical dividend growth to value Banco Popular and concluded that we would over value the firm for two reasons. First, we are overstating the expected dividends in the future by basing it on the dividends paid in 2013. Second, the growth rate we were assuming for the future (5%) may not be consistent with the payout ratio that we were assuming in the valuation.

BANCO POPULAR	2012	2013
Dividends - DOP	$3,108,832,420	$3,670,114,722
Earnings - DOP	$4,116,895,947	$4,346,744,942
Divd. Payout Ratio	75.51%	84.43%
Stable growth in earnings		5.00%
Book value - DOP	$20,688,388,231	$22,365,091,663
Implied Return on Equity		32.12%
Cost of Equity		12.00%
Exchange Rate		$41.74
Value of Equity - USD		$2,076,149,588
Price to Book		3.87x

Based on the 2013 numbers, where dividends were DOP$3,670,114,722 and earnings were DOP$4,346,744,942, the payout ratio is 84.43%. To deliver a growth rate of 5% a year forever, the return on equity that Banco Popular would have to deliver on it's new investment is 32.12%.

$$Implied\ Return\ on\ Equity = \frac{5\%}{(1 - 84.43\%)} = 32.12\%$$

If we believe that the return on equity, in the future, at Banco Popular will be lower than 32.12%, we have to either lower growth or reduce dividends.

Implied Return on Equity Sensitivity: Payout Ratio & Earnings Growth	5.0%	2.5%
95.00%	100.0%	50.0%
90.00%	50.0%	25.0%
85.00%	33.3%	16.7%

Rather than base the valuation on the 2013 dividend and earnings numbers, which are unstable, we chose a different path. We started with the book value of equity of DOP$22,365,091,663 million that Banco Popular reported at the end of 2013, and estimated what earnings and dividends would be at a normalized return on equity. For instance, where the return on equity at Banco Popular reverts back quickly to 25%.

Book value - DOP 2013	$22,365,091,663
Normalized ROE	25.0%
Normalized net income - DOP	$5,591,272,916
Earnings grow at a stable rate	2.5%
Cost of Equity	12.00%
Dividend Payout ratio	90.00%
Value of equity - DOP	$52,969,953,939
Exchange Rate	$43.31
Value of equity - USD	$1,223,025,641
Price to Book	2.37x

The normalized net income for next year would be as follows:

$$Normalized\ net\ income = Book\ value\ of\ equity \times Normalized\ ROE$$

$$Normalized\ net\ income = DOP\$22{,}365{,}091{,}663 \times 25\% = DOP\$5{,}591{,}272{,}916$$

Assuming that these earnings would grow at a stable rate of 2.5% a year in perpetuity, we next estimated the dividend payout ratio:

$$Payout\ ratio\ in\ stable\ growth = 1 - \frac{g}{ROE_{stable\ growth}}$$

$$Payout\ ratio\ in\ stable\ growth = 1 - \frac{2.5\%}{25\%} = 90\%$$

If we assume that the cost of equity of 12% is a reasonable value, we can estimate the value of equity in Banco Popular:

$$Value\ of\ Equity = \frac{Expected\ Dividends\ next\ year}{(Cost\ of\ Equity - Stable\ growth\ rate)}$$

$$Value\ of\ Equity = \frac{Net\ Income\ \times\ Payout\ Ratio}{(Cost\ of\ Equity - Stable\ growth\ rate)}$$

$$Value\ of\ Equity = \frac{DOP\$5{,}591{,}272{,}915\ \times\ 90\%}{(12\% - 2.5\%)} = DOP\$52{,}969{,}953{,}938$$

$$USD\ Value\ of\ Equity = \frac{DOP\$52{,}969{,}953{,}938}{DOP\$43.31} = USD\$1{,}223{,}025{,}640$$

The two inputs that will determine the value of equity at Banco Popular are the return on equity and the cost of equity. As we lower the return on equity, the normalized net income will decrease and the payout out ratio will decrease as well (for the given growth rate of 2.5%). The cost of equity can also change, if we perceive that banks in the Dominican Republic have become riskier. Following the same procedure that we just did, we valued equity at Banco Popular under two other scenario – an optimistic scenario where the normalized return on equity increases to 30% and the cost of equity decreases to 11% and a pessimistic scenario, where the return on equity reverts to 20% and the cost of equity increases to 13%.

Value of Equity USD Sensitivity: Cost of Equity & ROE	30%	20%
13.00%	$1,352,446,344	$860,647,673
12.00%	$1,494,809,117	$951,242,165
11.00%	$1,670,669,013	$1,063,153,008