Keywords: Dual credit, CAFC credit, NEV credit, Passenger vehicle.

Abstract. The dual-credit policy for passenger vehicles in China is a major policy innovation by China. It is based on corporate fuel consumption standard (CAFC) and new energy vehicle (NEV) credit standard and is an effective means to implement the two standards. It gives companies flexibility to comply with fuel-efficient standards for passenger cars, facilitating government enforcement and helping China's passenger cars become low-carbon.

Introduction

The dual-credit policy for passenger vehicles in China is about CAFC credit and NEV credit for passenger vehicles, as well as the policy of interconnection of these two credits. China’s dual-credit policy for passenger vehicles is unique, worthy of in-depth study.

The Policy about CAFC Credits

China's dual-credit policy for passenger vehicles was formally implemented in 2016-2020, it relies on CAFC standard and NEV standard for passenger vehicles.

CAFC Standard for Passenger Vehicles (2016-2020)

A CAFC standard (target) is an average fuel consumption (FC) target of a firm’s vehicles, and the FC targets of vehicle types are the FC targets to be achieved by each vehicle types. The CAFC standard for passenger vehicles is based on FC standards (targets) for passenger vehicle types, and the former is mandatory, the latter are for reference. i.e., it is not mandatory for any vehicle type of a firm to reach its FC target, but it is mandatory for the actual CAFC to reach the CAFC target (allowing use of flexible mechanism with dual-credit policy). The actual CAFC is the average FC of a firm’s passenger vehicles, which depends on tested FCs and outputs of vehicle types. Obviously, if the FCs of some vehicle types of a firm are higher than their FC targets, while the FCs of other vehicle types are lower than their FC targets, the actual CAFC may still reach the CAFC target.

FC Targets for Vehicle Types in 2020

The policy only clarifies FC targets for vehicle types in 2020 (table 1).

<table>
<thead>
<tr>
<th>CW(kg)</th>
<th>FC targets of vehicle types(L/100km)</th>
<th>CW(kg)</th>
<th>FC targets of vehicle types(L/100km)</th>
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<td>Number of Seat rows &lt;3</td>
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<tr>
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<td>4.5</td>
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<tr>
<td>865&lt;CW≤980</td>
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<td>4.5</td>
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<td>5.3</td>
<td>5.5</td>
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Table 1. FC targets for vehicle types in 2020.
Calculation of Annual CAFC Target

The calculation of annual CAFC targets for 2016-2020 is divided into two parts: first, the initial CAFC targets for 2016-2020 are calculated according to annual productions of vehicle types and the FC targets of vehicle types in 2020. Secondly, the initial CAFC targets of the above years is multiplied by 1.34, 1.28, 1.20, 1.10 and 1.0 respectively, to get annual CAFC targets between 2016-2020.

The Rules on CAFC Credits

CAFC credits are the product of the difference between CAFC target (CAFC_T) minus the actual CAFC (CAFC_A), times the annual output of passenger vehicles. That is to say, when an automaker's CAFC_A ≤ CAFC_T, it receives positive or zero credit, therefore it complies with CAFC standard. If its CAFC credit is negative, it must make up the difference within the prescribed deadline, otherwise it will face the punishment of suspending the production and application of highly inefficient vehicles.

CAFC credits cannot be freely traded, only can be transferred among affiliated firms. The transferred credits are only used to offset negative CAFC credits, cannot be transferred again or carried forward. CAFC credits cannot be overdrawn, but can be carried forward, the carried forward credits are valid in 3 years. CAFC credits are converted every time when they are carried forward, the conversion rate for 2016-2018 credits is 80%, and for 2019 and beyond, it is 90%. In addition, A negative CAFC credit can be offset by a positive NEV credit (Fig. 1).

The Policy about NEV Credits

Credits for NEV Types

3 vehicle categories are new energy vehicles (NEVs) recognized by China, they are battery electric vehicles (BEVs), plug-in hybrid electric vehicles (PHEVs) and fuel cell vehicles (FCVs). The NEV credits of BEV types depend on their driving ranges, curb weights, power consumptions per 100km, and other factors. The NEV credits of PHEV types depend on their electric driving ranges, power consumptions per 100km or fuel consumptions per 100km. The NEV credits of FCV types depend on the rated powers of fuel cell systems.

NEV Credit Target (Standard)

The NEV credit target is the amount of NEV credits that a firm must have, which is equal to the product of the firm's output of conventional energy vehicle and the percentage of NEV credit obligation. The percentages of NEV credit obligation in 2016-2018 are 0, and in 2019 and 2020 they are 10% and 12% respectively.
The Rules on NEV Credits

The NEV gross credits of a firm are the sum of its NEVs’ credits. A firm’s net NEV credits are the difference between its NEV gross credits and NEV credit target, including positive NEV credits and negative NEV credits. Positive NEV credits can be freely traded and cannot be carried forward or overdrawn. However, the year 2019 is an exception -- positive NEV credits of this year can be carried forward to next year without discount, and NEV credits of the year 2020 can be overdrawn for compliance in 2019. It is worth noting that, the positive CAFC credits cannot offset the negative NEV credits.

The Status Quo and Trends of Dual-credit Market

The evolvement of China’s CAFC standard into CAFC credit system is a sign of its maturity. Due to increasingly strict CAFC standards, the trends of China's CAFC credit market from 2016 to 2018 are as follows: there are many positive credits, but the first slight increase of positive credits is followed by a sharp decline; Negative CAFC credits are few but increase sharply (figure 2). During this period, the output of NEV passenger vehicles (1.028 million units in 2018) and NEV credits per unit are ever increasing, and automakers were exempted from percentages of NEV credit obligation, so NEV credits increased sharply, reaching 4.0353 million in 2018 (Fig. 2).

Because of the transfer and trading rules of dual credits (CAFC credits can only be transferred between affiliated firms, the CAFC credits can be carried forward at a 80% discount rate every time during a validity period of 3 years, NEV credits cannot be carried forward and a positive NEV credit can offset a negative CAFC credit), we can make some speculations about the dual-credit market from 2016 through 2018.

The Status Quo of Dual-credit Market

Firstly, negative CAFC credits are mainly offset by positive NEV credits in the three years (2016-2018), then by positive CAFC credits earned during the transitional period from 2013 to 2015. After strict control and simplification, the positive CAFC credits in this 3-year transitional period is 31.04 million, 15.42 million and 14.38 million, respectively. Negative CAFC credits and NEV credits during the transitional period were not counted. Second, the positive NEV credits that must be transferred + the transitional (2013-2015) CAFC credits that must be transferred + the transferable CAFC credits in non-transitional period are much more than the negative CAFC credits needed to be compensated every year. Therefore, the prices of NEV credits and CAFC credits in transitional period are low, and those firms with repayment obligations of negative CAFC credit are under little pressure. Third, all positive CAFC credits in non-transitional period will be carried forward to meet the stricter CAFC standards and NEV credit obligations in the future.

The Trends of Dual-credit Market

According to percentage of NEV credit obligation in 2019 (10%), and assuming that the overall output of conventional passenger vehicles in 2019 is the same as that in 2018 (22.44 million units), then the gross NEV credits in 2019 must be deducted to count as positive NEV points. Assuming that the gross NEV credits in 2019 are 5 million (4.035 million in 2018), then the positive NEV credits in that year are only 2.756 million, which is greatly reduced from that in 2018. If the negative CAFC credits in the year 2019 increase at an average annual rate of 30% as during 2016 and 2018, then the negative CAFC credits in 2019 will be approximately 3.835 million (cf. the negative CAFC credits in 2018 are 2.95 million).

In other words, positive NEV credits that can be used to offset negative CAFC credits in 2019 will become scarce. Firms with negative CAFC credits to be offset may purchase positive NEV credits at high prices, unless they can rely on the transfer of CAFC credits of affiliated firms or use the CAFC credits carried forward and the positive NEV credits created by themselves in that year.

As mentioned above, although firms can overdraw the positive NEV credits of 2020 in 2019, the positive NEV credits of 2019 can also be carried forward by the same amount for one year, and the
CAFC standard and percentage of NEV credit obligation in 2020 (12%) are stricter than those in 2019. Taken together, the scarcity of NEV credits in 2019 will worsen rather than improve.

The CAFC standard and obligation of NEV credit in the FC standard for passenger cars (2021-2025) will be more stringent. If there is no greater policy flexibility, it will inevitably happen that both credits are in short supply, and carmakers will face tremendous pressure, therefore, it is necessary to reform the dual-credit policy and enhance the flexibility of policy and the liquidity of the dual-credit market.

![Figure 2. China’s CAFC credits and NEV credits (2013-2018).](image)

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**References**


