

## Some Notes on “Momentum”

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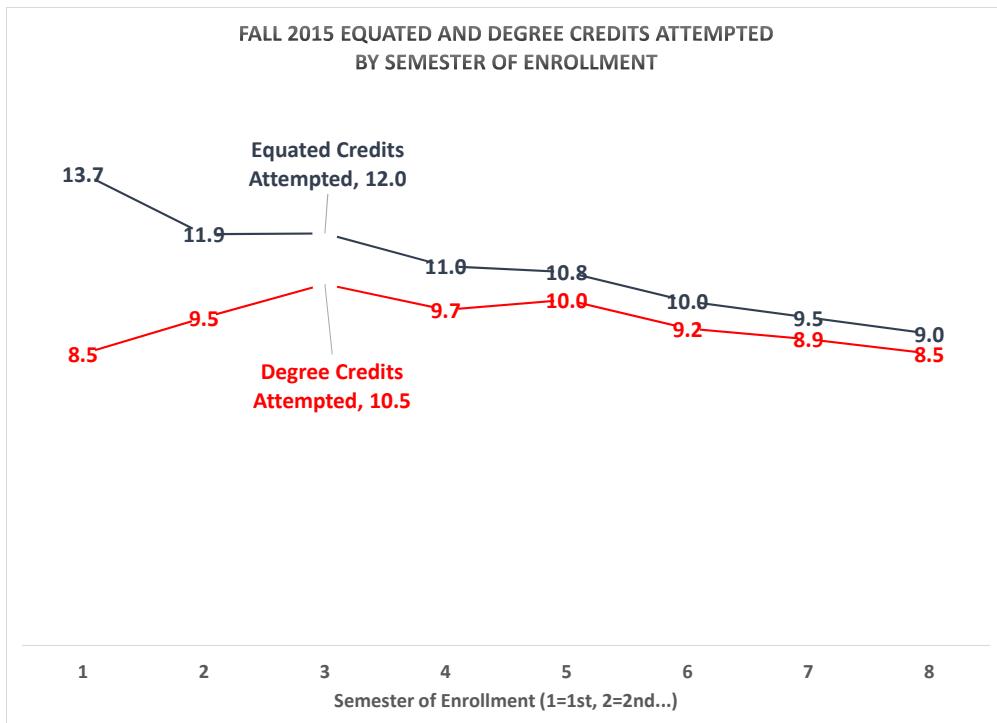
### Momentum—What’s Going On

Figure 1 shows what we all know, the average student load of equated credits (those that *include* developmental courses, extra lab hours, practicum hours and not-for-credit (as opposed to most of the new FYS offerings) first year seminars, drops below full-time after the first semester.

What is a bit startling, however, (and, if I were selling something online would be labeled: THIS WEIRD TRICK WILL CHANGE YOUR MIND ABOUT MOMENTUM) is that almost all of the loss occurs in not-for-degree-credit courses.

- Students INCREASE the number of degree credit courses attempted on average through the third semester and **never** go below the degree credit load they took in the first semester.
- Students appear to take about three three-credit degree courses every semester.
- The decline in load is almost entirely caused by getting developmental courses out of the way.
- Our average student appears to feel that they can handle only about three degree courses at a time. They also appear to feel that they can get developmental courses out of the way with no effort. (I will try to follow up with interviews by the Street Team to see the extent to which this is true.)
- The average student graduates after six semesters. Thus, the real decline occurs after most students who will graduate have graduated and only true part-time students remain.

Table 1 shows the numbers of students enrolled in Fall 2015 by the number of credit semesters in which they were enrolled, as well as the numbers on Figure 1. Since only semesters in which they were degree students were counted, CUNYStart, College Now (and other high school enrollments) and USIP semesters were not counted.



**Figure 1**

Fall 2015 Semester Load by Number of Semesters Attended			
Semester of Attendance	N	Equated Credits Attempted	Degree Credits Attempted
1	4,454	13.7	8.5
2	2,305	11.9	9.5
3	2,873	12.0	10.5
4	1,529	11.0	9.7
5	1,503	10.8	10.0
6	780	10.0	9.2
7	491	9.5	8.9
8	236	9.0	8.5

**Table 1**

#### **Historical Momentum (static)**

Figure 1 shows the numbers of Fall 2016 continuing, degree students by the average number of degree credits they earned in each semester of degree attendance. (Thus, CUNYStart, College Now and USIP semesters were not included.) This is a static, rather than dynamic, measure, because it does not indicate whether the students were speeding up or slowing down. It is historical because it is an average of past semesters' credits earned and does not include the current semester.

The figure indicates that the bulk of these continuing students have averaged between three and twelve degree credits earned per semester with high peaks between five and nine.

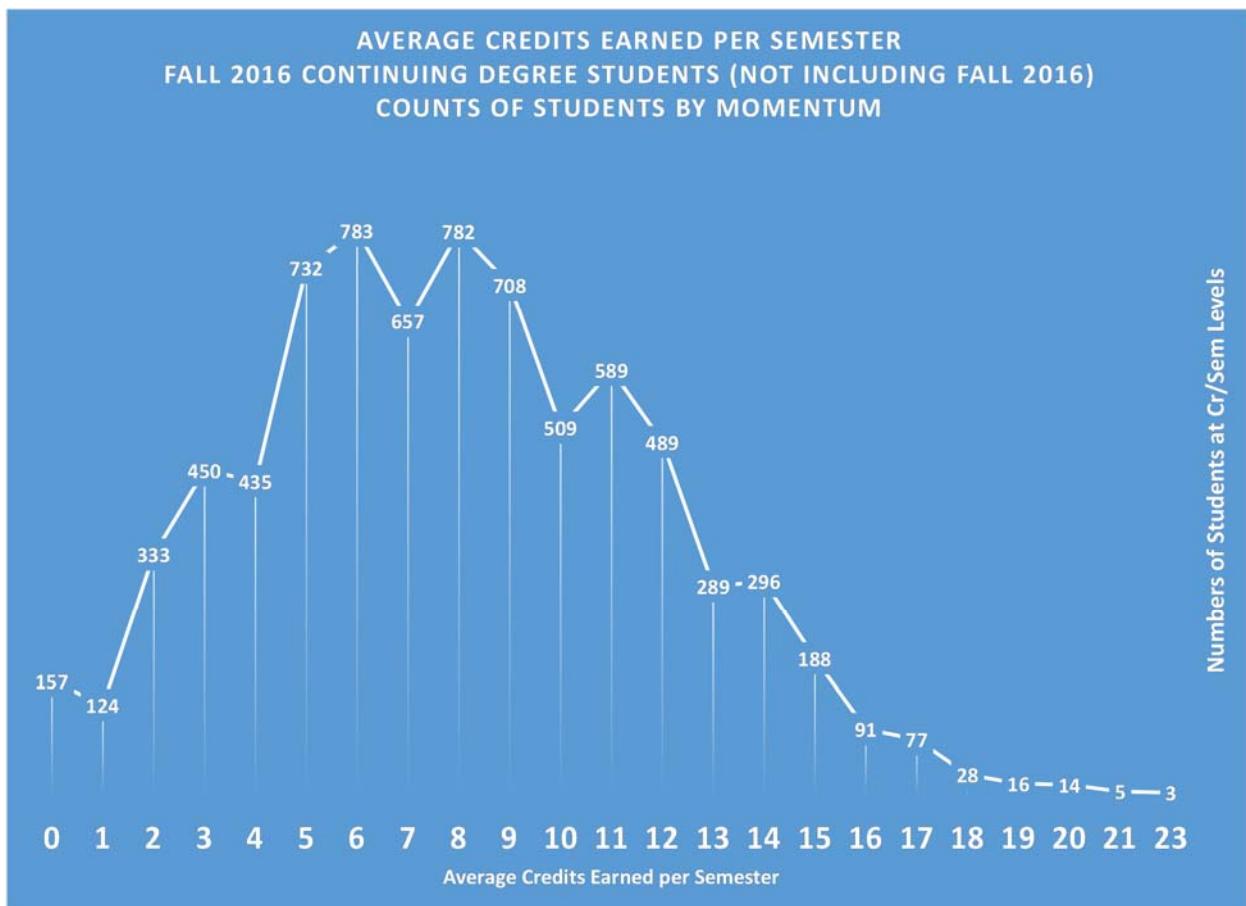


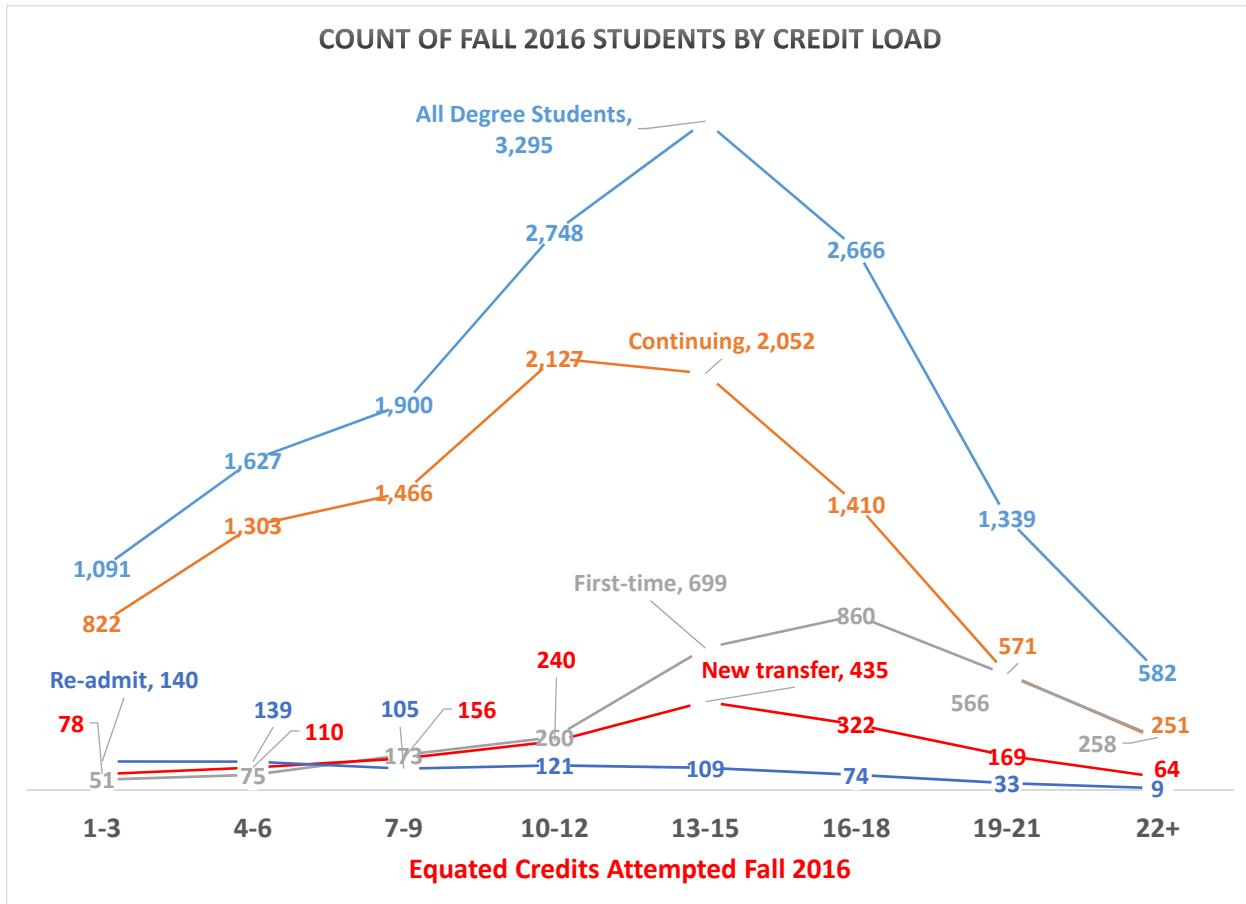
Figure 1

### Current momentum (static)

In Figure 2 we see numbers of students, total and by enrollment category, by equated credits attempted in Fall 2016.

For all students the peak is 13-15 credits. Continuing students peak between 10-15 credits, while first-time students peak at 16-18. New transfers peak somewhat below first-time students at 13-15, while re-admits have a very low peak at 4-6, but, in fact, the numbers are low for re-admits and the levels are scattered.

While we generally think that first-time students don't have jobs, but gain employment as they progress through school, this graph begs the question of whether first-semester students also take too high a load and slow down to try to gain academic traction.

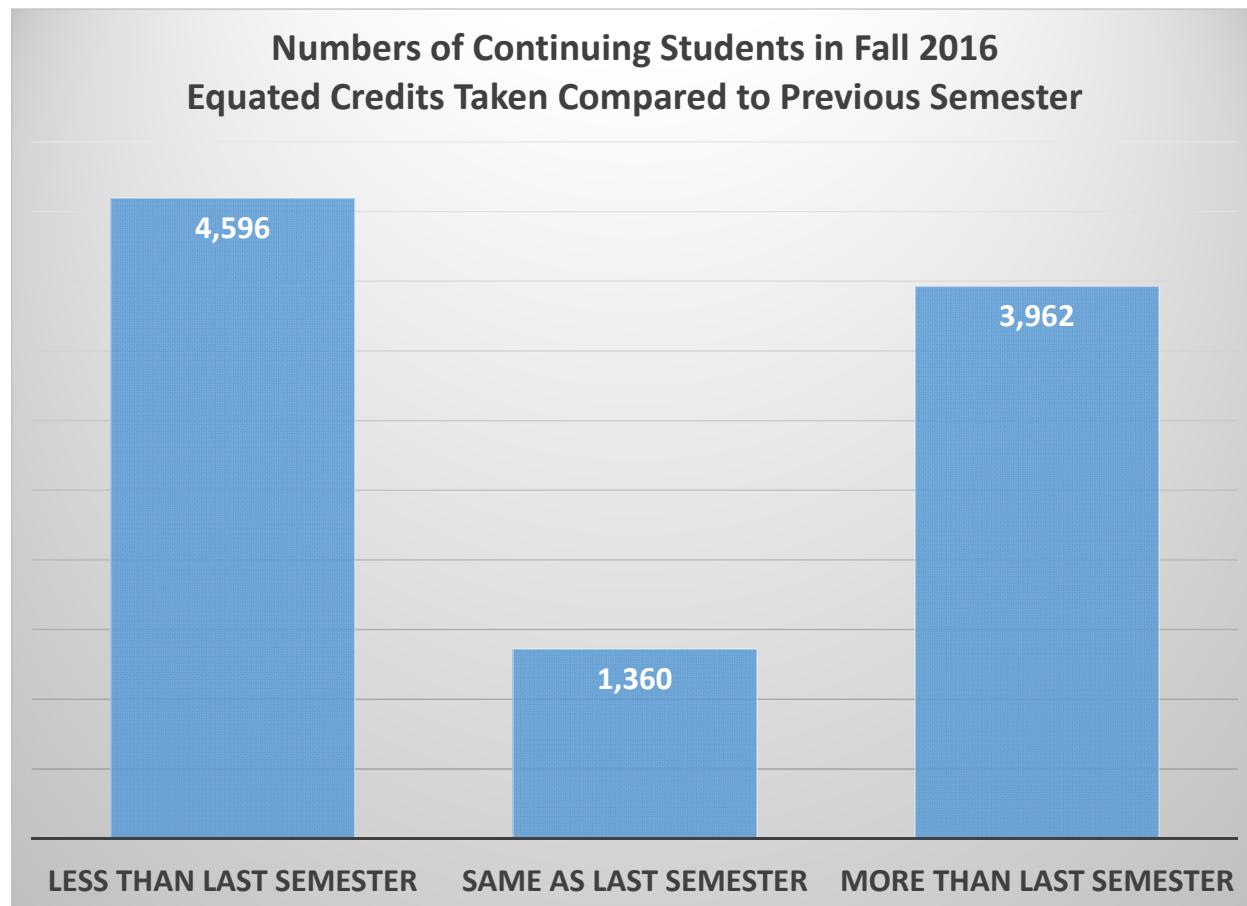


**Figure 2**

### Current Momentum (dynamic)

Figure 3 shows the numbers of Fall 2016 continuing students by whether they took more, fewer or the same equated credit load as their previous semester (whether or not it was Spring 2016).

About 16% more students took fewer credits compared to those who took more in Fall 2016.



**Figure 3**

Other possible measures:

Historical, dynamic—this measure would show whether a student was, in general, taking more or fewer credits in previous semesters. Since most students take fewer equated credits over time, this measure might show how quickly a student was slowing down. If it is given that students slow down, controlling the slow down would be a goal.

Weighted, historical—this measure would give a number indicating the average credit load of a student, but with more weight given to recent semesters.

Statistical Composite—One existing measure is the student's probability of returning in two semesters, developed by Jenny Zhu in this office. This measure statistically combines factors like GPA, existing developmental needs, numbers of withdrawals, gender, and credits earned to

arrive at an indication of whether the student will return in two semesters. This is a historical, static indicator. A dynamic indicator may be found by comparing the probabilities for a given student in two or more consecutive semesters.

**Simple Composite**—A set of factors, like GPA, credits earned, developmental needs met, and percentage of credits earned of those attempted might be assembled. Each factor might be given a status rating for various levels: low, medium or high, for example. Each student might be scored on the factors and the factors' ratings combined (with or without weights) to yield an overall rating for the student.

**Multiple Component**—This measure combines several incompatible measures. The best example is the current report of students who have missed all classes for one or two weeks, prepared by Erez Lenchner, and their retention probability. This is a combination of static historical and very current measures.

**Fixed course achievement**—Each major could have a series of courses that students would need to achieve in each given semester. Students would either be on course or off, depending on whether they had succeeded in earning credits in each course during the given semester. All possible course substitutions would need to be given in advance to make the calculations possible.

**Variable goals**—Almost any measure could be used, as long as we regularly collected student data on the measure. The advisor would agree with the student on the goal. The student would either make that goal or fail.

### **Summary**

In physics momentum is mass times velocity. Even in physics momentum has a definition that depends on multiple components. Slow velocity can be made up for with higher mass. The same is true with students. Students who are close to graduation (high mass) may be part-time (low velocity). That's why I favor the multiple component measure. (See, "Developing a Single Tool for Assessing Student Retention Interventions" for a description of the methodology.)

Jenny's statistical probability increases every time a student earns a degree credit. It increases as the student's GPA goes up. It falls each time a student takes a WU. When the student moves to a new semester and goes from part-time to full-time, the statistic increases, making it very sensitive to decisions.

The measure can be displayed in terms of risk of dropping out in categories like high, medium and low. The cut-offs between categories can be set to match the resources we have available. If we only have resources to work with 500 high probability students, then we would set the category to include only the 500 students with the highest drop-out probability.

In addition to the categories, I recommend that we also show each component's score: the GPA, the number of credits earned, and the number of WUs taken, for example. Some of the

components are proxies. We believe that gender is a proxy for help-seeking. At some point we hope to have a better measure of help-seeking, perhaps based on SEMS data. (All components are tested for continuing relevance. One shown in the “Developing...” paper mentioned above that may be pulled, for example, is student age. That component’s impact seems to change each semester, making it a candidate for dismissal as “statistical fluff.”)

An additional, dynamic measure could also be included for continuing students by comparing a student’s current probability with previous probabilities.

A separate display might include a risk indicator for attendance. Currently Erez produces a warning list for students who have missed all classes over two weeks.

In any case, assessment of momentum depends on a clear definition of what we mean and how to measure it.