



Understanding Academic Procrastination Through a Moderated Mediation Framework: Examining Self-Efficacy, Motivation, and Self-Regulated Learning

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Abstract: This study aims to analyze the influence of academic self-efficacy and learning motivation on academic procrastination with self-regulated learning as a mediating variable and academic pressure as a moderation variable. This study uses a quantitative approach with an explanatory method. The population of this study is all students of grade XI Social Studies with a sample of 124 students determined by simple random sampling technique. Data collection used a likert scale questionnaire and analyzed with Structural Equation Modeling (SEM-PLS). The results of the study showed that academic self-efficacy and learning motivation had a negative and significant effect on academic procrastination. Self-regulated learning has a significant effect and has been proven to mediate the relationship between academic self-efficacy and learning motivation to academic procrastination. In the moderation test, academic pressure did not moderate the relationship between academic self-efficacy and academic procrastination, but it strengthened the relationship between learning motivation and academic procrastination. This finding indicates that learning motivation is more responsive to academic demands, whereas academic self-efficacy tends to function as a relatively stable internal belief. These findings contribute to the development of adaptive learning strategies oriented towards student learning independence.

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Introduction

Education plays a strategic role in improving the quality of human resources, especially amid the rapid development of science and technology. Students are individuals in the process of cognitive, affective, and psychomotor development through learning activities in both formal and non-formal education (Akhiruyanto et al., 2022; Michael & Matete, 2024). At the high school level, students face increasingly complex academic demands, including the ability to understand subject matter in depth and achieve optimal learning outcomes (Rahmi, 2024; Rohmadi et al., 2024). One subject that requires analytical skills and conceptual understanding is economics, so students must be able to manage the learning process effectively and independently (Bowles & Carlin, 2020).

However, in practice, not all students can manage learning activities effectively (Otto et al., 2023; Schmid et al., 2022). One problem that often arises is academic procrastination, the tendency to delay completing academic assignments even though individuals are aware of the negative consequences. Based on initial research, 50% of students often postpone assignments (academic procrastination), and 60% have been late in submitting assignments. In addition, 23.3% of students prefer other activities to economic assignments, and 40% of students postpone studying even though they know exams will be held in the near future. The

impact of this behavior is evident in 66.7% of students who achieve suboptimal learning outcomes due to academic procrastination.

The findings align with studies showing that academic procrastination remains high among high school students. Globally, around 30% to 70% of students experience academic procrastination, and the conditions vary from mild to quite severe (Arnold, 2023). In addition, other findings indicate that approximately 55.1% of students experience academic procrastination, suggesting that this phenomenon remains relatively high and poses a serious problem in the learning process (Daryani et al., 2021). In addition, other studies show that students' level of procrastination is mostly in the moderate category, with psychological factors as the main cause (Huang et al., 2025). This shows that academic procrastination remains a significant problem in education, affecting declining learning outcomes and increasing academic stress.

This phenomenon of academic procrastination indicates problems with the individual's self-regulation and confidence in their ability to complete tasks. From the perspective of Social Cognitive Theory, a person's behavior is influenced by reciprocal interactions among personal, behavioral, and environmental factors (Bandura & Cervone, 1986). One of the personal factors that plays an important role is academic self-efficacy, an individual's belief in their ability to complete academic tasks, which can help reduce the tendency to procrastinate. On the other hand, low self-efficacy tends to make individuals hesitate and avoid tasks, leading to academic procrastination (Rad et al., 2025). In the context of economic learning, this tendency becomes more complex because economics subjects often involve abstract concepts, graphical analysis such as demand and supply curves, accounting calculations, and market logic that require analytical and quantitative thinking (Manzi & Moreeng, 2023). These learning demands are frequently perceived as difficult and intimidating, particularly by social science students who may have lower confidence in numerical and analytical skills. As a result, students tend to delay studying, completing assignments, or preparing for examinations as a form of avoidance behaviour, which ultimately increases academic procrastination (Khurshid et al., 2025).

In addition to academic self-efficacy, motivation is also an important factor in determining students' academic behavior (Howard et al., 2021). High motivation to learn makes students more active, diligent, and responsible in completing academic tasks. Conversely, low motivation leads to a lack of motivation to complete tasks immediately, thereby increasing academic procrastination. Other research shows that low motivation to learn and the inability to set priorities are among the main triggers of academic procrastination (Sarwar et al., 2025).

In Social Cognitive Theory, a person's ability to regulate the self-regulated learning process also plays an important role (Bandura & Cervone, 1986). Self-regulated learning shows students' ability to plan, monitor, and evaluate their learning process independently (Mejeh et al., 2024). Students with strong self-regulation skills tend to be better at managing time, setting priorities, and avoiding procrastination. On the other hand, low self-regulation in students increases tendencies toward procrastination because they are unable to effectively control their learning behavior (Saiftri et al., 2024).

On the other hand, environmental factors, such as academic pressure, also influence student behavior (Zhang et al., 2024). High academic pressure, such as the number of academic assignments, high grade demands, and academic competition, can have different impacts on each individual. For some students, academic pressure can increase motivation and performance, but for others, it can cause stress and anxiety that leads to procrastination. Less conducive learning environments and social influences can also strengthen students'



tendency to procrastinate on academic assignments (Sarwar et al., 2025; Svartdal et al., 2020).

Although various studies have examined academic procrastination, previous research still faces limitations (Esteban et al., 2024; Santos et al., 2025). Most studies examine only the direct relationships between variables, without considering the roles of mediating and moderating variables simultaneously. In addition, studies that integrate self-regulated learning as mediators and academic pressure as moderators within a single research model are still relatively limited, especially in the context of economic learning. Based on these research gaps, research is needed that comprehensively examines the relationship between academic self-efficacy and learning motivation to procrastination, involving self-regulated learning as a mediating variable and academic pressure as a moderating variable, within an integrated structural model.

The novelty of this research lies in the development of a model that integrates mediation and moderation variables simultaneously within a single analytical framework. This study not only examines the direct influence of academic self-efficacy and learning motivation on academic procrastination, but also examines self-regulated learning, which explains the relationship indirectly. In addition, this study examines the role of academic pressure as a moderating variable that can strengthen or weaken relationships in the context of economic learning at the high school level.

Based on this description, academic procrastination is a complex phenomenon influenced by personal and environmental factors as described in Social Cognitive Theory. Therefore, this study aims to analyze the influence of academic self-efficacy and learning motivation on academic procrastination in economics subjects, with self-regulated learning as the mediating variable and academic pressure as the moderating variable. The research is expected to make a theoretical contribution to the study of student learning behavior and to provide practical implications for designing effective learning strategies to minimize academic procrastination.

Research Method

This study uses a quantitative approach to objectively measure relationships among variables through numerical data analysis (Creswell & Hirose, 2023). This approach was chosen because the research aims to systematically examine the relationships among variables by using numerical data, statistical techniques, and structured analysis within a scientific framework. This research's methodology falls within the explanatory research category, which aims to test hypotheses and explain causal relationships among variables (Casula et al., 2021; Creswell & Hirose, 2023). Explanatory research is used to strengthen or retest existing theories and to explain how the relationship between variables can be generalized from the sample to the population. Data were collected using a survey method by distributing questionnaires adapted from established theoretical frameworks and previous studies, including academic procrastination indicators developed by Ferrari et al., (1995), academic self-efficacy based on Bandura & Cervone (1986), learning motivation adapted from hamzah B. Uno (2016), self-regulated learning based on Zimmerman (2002), and academic pressure based on Sun et al. (2011).

The population in this study was all 180 students in class XI social studies. Class XI social studies was chosen because the students had studied economics material relevant to the research variables and were at a relatively stable learning stage, thus being considered representative to support the generalization of research findings. The sampling technique uses simple random sampling, a probability sampling method in which each member of the

population has an equal chance of being selected into the research sample (Sekaran & Bougie, 2016). This technique is used to minimize bias (errors) in sample selection and to increase the representativeness of the data pulled.

The data analysis in this study employs Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS software version 4.1 (Hair et al., 2021; Sarstedt et al., 2024). This method was chosen because it can handle complex structural models and relatively small sample sizes, and does not require normality of the data distribution. In addition, PLS-SEM is widely used to test causal relationships among variables in latent-concept-based quantitative research. Model evaluation is conducted in two stages: the measurement model (outer model) and the structural model (inner model). The outer model is used to test the validity and reliability of the construct using outer loadings, Average Variance Extracted (AVE), and Composite Reliability (CR). Meanwhile, the inner model is used to test relationships among variables through path coefficient analysis, R-square values, and significance testing via bootstrapping (Hair et al., 2021; Putra, 2022).

Results and Discussion

The construction of the path diagram used in this study can be seen in Figure 1

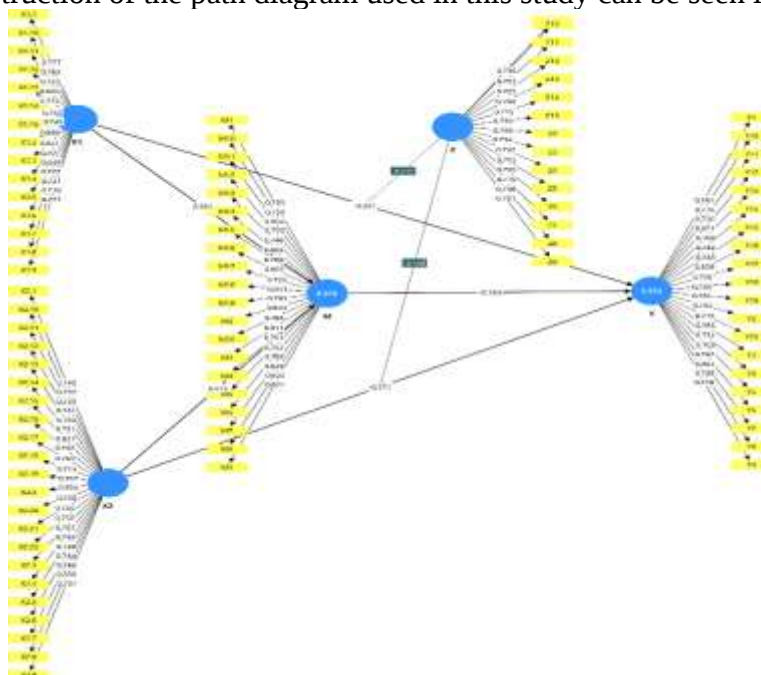


Figure 1. Partial Least Squares (PLS) Construct Model

Outer Model Analysis

The outer model analysis consists of a validity test and a reliability test, which will be described as follows. The validity test concerns the extent to which the instrument used can measure exactly what it is intended to measure. Based on the results of the convergent validity test in Table 1, all indicators exceeded the recommended loading threshold of 0.70, indicating satisfactory convergent validity.

Table 1. Results of Outer Loading Convergent Validity Test

Variable	Number of Indicators	Loading Range	Remarks
X1 (Academic Self-Efficacy)	15	0.707 – 0.869	Valid
X2 (Learning Motivation)	22	0.707 – 0.837	Valid
M (Self-Regulated Learning)	20	0.726 – 0.833	Valid

Y (Academic Procrastination)	15	0.715 – 0.868	Valid
Z (Academic Pressure)	20	0.708 – 0.853	Valid

Reliability tests include Composite Reliability and Cronbach's Alpha. Composite reliability measures the extent of internal consistency and assesses the unidimensionality of a construct. While Cronbach's alpha is used to measure the level of external consistency, it does not assess the unidimensionality of the construct.

Table 2. Cronbach's Alpha and Composite Reliability Values

Variable	Cronbach's alpha	Composite reliability	Remarks
M	0.968	0.971	Reliable
X1	0.951	0.956	Reliable
X2	0.965	0.968	Reliable
Y	0.963	0.966	Reliable
Z	0.947	0.953	Reliable

Based on Table 2, all variables in the model have Cronbach's Alpha and Composite Reliability values above the minimum threshold of 0.70, indicating they are reliable. Cronbach's Alpha values indicate that the M variable (Learning Motivation) has a value of 0.968, followed by X2 (0.965), Y (0.963), X1 (0.951), and Z (0.947), suggesting that all instruments have excellent internal consistency in measuring their constructs. Meanwhile, the Composite Reliability value also supports these results, with the M variable having the highest value of 0.971, followed by X2 (0.968), Y (0.966), X1 (0.956), and Z (0.953). Thus, it can be concluded that all constructs in the model have met the reliability criteria for both Cronbach's Alpha and Composite Reliability, making them suitable for further analysis.

Discriminant Validity

Discriminant validity is used to ensure that the constructs or variables in a measurement model actually measure distinct phenomena and do not overlap.

Table 3. Value of Discriminants validity

Variable	M	X1	X2	Y	Z	$\sqrt{\text{AVE}}$	Stuttgart
M	1.000	0.435	0.518	-0.433	-0.088	0.789	Valid
X1	0.435	1.000	0.113	-0.399	0.127	0.771	Valid
X2	0.518	0.113	1.000	-0.425	-0.166	0.759	Valid
Y	-0.433	-0.399	-0.425	1.000	-0.461	0.768	Valid
Z	-0.088	0.127	-0.166	-0.461	1.000	0.759	Valid

The value of Latent Variable Correlation can be seen by comparing the value (Fornell-Lacker). The value must be greater than the correlation value between latent variables in the same row/column. If the result is large, then the validity discrimination is met. Based on the test results, the entire value of each variable (M = 0.789, X1 = 0.771, X2 = 0.759, Y = 0.768, Z = 0.759) is greater than the correlation between the latent variables in the same row and column. Thus, the model meets the criteria for discriminant validity based on the Fornell-Lacker approach, as each construct distinguishes itself from the others.

Inner Model Analysis

Internal model analysis is a process for assessing the relationships between exogenous and endogenous latent variables in a structural model. The purpose of this evaluation is to assess the extent to which the model that has been built can explain the relationship between existing constructs, as well as to measure the extent of the influence of independent variables on dependent variables.

Contribution Analysis (R^2)

Table 4. Contribution Test Results (R^2)

Var. Dependencies	R-square	R-square adjusted
M	0.412	0.402
Y	0.582	0.560

Based on Table 5, the R^2 results indicate that the independent variables explain a large proportion of the variance in the dependent variables. The R^2 value for the Self-Regulated Learning (M) variable of 0.412 indicates that 41.2% of the variation in Self-Regulated Learning can be explained by independent constructs in the model, while the remaining 58.8% is explained by other factors outside the model. This value falls within the moderate (moderate) category. Meanwhile, the R^2 value for the Academic Procrastination (Y) variable of 0.582 indicates that 58.2% of the variation in Academic Procrastination is explained by the constructs in the model, with the remaining 41.8% influenced by variables outside the model. This value is also in the moderate (moderate) category, as it is in the range of 0.50–0.75. In addition, the adjusted R-square showed results that were not much different, namely 0.402 for the M variable and 0.560 for the Y variable, further strengthening the model's fairly good explanatory ability and suitability for further analysis.

Path Coefficient Analysis

The evaluation of the estimated path coefficients in this study used SmartPLS with a bootstrapping procedure. The results of the evaluation of the estimated path coefficients were then used as the basis for decision-making in hypothesis testing.

Table 6. Path Coefficient Test Results

Hypothesis	Path coefficient	T statistics	P values	Remarks
H1: X1 -> Y	-0.227	3.294	0.000	Accepted
H2: X2 -> Y	-0.371	5.699	0.000	Accepted
H3: X1 -> M	0.381	6.959	0.000	Accepted
H4: X2 -> M	0.475	7.144	0.000	Accepted
H5: M -> Y	-0.184	2.365	0.009	Accepted
H6: Z -> Y	-0.520	8.560	0.000	Accepted
H7: Z x X1 -> Y	-0.037	0.733	0.232	Rejected
H8: Z x X2 -> Y	-0.106	1.940	0.026	Accepted

H1: Academic Self-Efficacy on Academic Procrastination

The X1 variable affects Y with a path coefficient of -0.227, a t-statistic of 3.294 (>1.96), and a P-value of 0.000 (<0.05). This shows that H1 is accepted.

H2: Learning Motivation for Academic Procrastination

The X2 variable affects Y with a path coefficient value of -0.371, a T-statistic value of 5.699 (>1.96), and a P-value of 0.000 (<0.05). This shows that H2 is accepted.

H3: Academic Self-Efficacy on Self-Regulated Learning

The X1 variable affects M with a path coefficient of 0.381, a t-statistic of 6.959 (>1.96), and a P-value of 0.000 (<0.05). This shows that H3 is accepted.

H4: Learning Motivation for Self-Regulated Learning

The X2 variable affects M with a path coefficient value of 0.475, a T-statistic value of 7.144 (>1.96), and a P-value of 0.000 (<0.05). This shows that H4 is accepted.

H5: Self-Regulated Learning against Academic Procrastination

The M variable has an effect on Y with a path coefficient of -0.184, a t-statistic of 2.356 (>1.96), and a P-value of 0.009 (<0.05). This shows that H5 is accepted.

H6: Academic Pressure on Academic Procrastination

Variable Z affects Y with a path coefficient value of -0.520, a T-statistic value of 8.560 (>1.96), and a P-value of 0.000 (<0.05). This shows that H6 is accepted.

H7: Academic Pressure Moderation on the Relationship of Academic Self-Efficacy to Academic Procrastination.

The interaction of $Z \times X_1$ had an effect on Y but was not significant, with a path coefficient of -0.037 , a T -statistic of 0.733 (>1.96), and a P -value of 0.232 (<0.05). This shows that H7 is rejected.

H8: Academic Stress Moderation and the Relationship of Learning Motivation to Academic Procrastination.

The interaction of $Z \times X_2$ affects Y with a path coefficient value of -0.106 , a T -statistical value of 1.940 (>1.96), and a P -value of 0.026 (<0.05). This shows that H8 is accepted.

Discussion

The findings showed that academic self-efficacy negatively affected academic procrastination and positively affected self-regulated learning. In the context of economics learning, this relationship is closely related to the characteristics of economics subjects, which require students to understand abstract concepts, interpret demand and supply curves, analyse market phenomena, and complete accounting-related calculations simultaneously. These learning demands create relatively high cognitive load, particularly for social science students who often perceive economics as difficult and challenging. Under these conditions, students with high academic self-efficacy tend to perceive academic tasks as manageable, making them more willing to start assignments earlier, persist when facing difficulties, and independently regulate their learning activities. They are also more capable of organising study schedules, evaluating their understanding, and seeking alternative learning resources when encountering difficulties. In contrast, students with low self-efficacy tend to avoid challenging tasks because they fear making mistakes in calculations and economic analysis, which ultimately increases academic procrastination behaviour.

In addition, academic self-efficacy also strengthens students' self-regulated learning abilities. In economics learning, self-regulated learning becomes particularly important because many assignments require gradual understanding, repetitive practice, and independent analytical thinking that cannot be mastered through passive learning alone. Students who are able to manage study time, control distractions, and divide complex tasks into smaller stages tend to procrastinate less because they can manage academic demands more effectively. These findings indicate that self-efficacy functions as an important personal resource that supports behavioural regulation in demanding academic situations. This explanation is consistent with Social Cognitive Theory, which emphasises that beliefs in one's abilities influence behavioural persistence and self-regulation processes (Bandura & Cervone, 1986). These findings also support previous studies showing that academic self-efficacy is associated with lower academic procrastination and stronger self-regulated learning strategies (Cabras et al., 2024; Jud et al., 2024).

Another important finding revealed that learning motivation negatively affected academic procrastination and positively affected self-regulated learning. In economics learning, learning motivation plays an important role because economics materials are generally interconnected and cumulative. Difficulties in understanding basic concepts such as market equilibrium, elasticity, or accounting principles may affect students' ability to understand more advanced materials. Therefore, students with high learning motivation tend to maintain stronger engagement in learning activities because they realise that delaying assignments will only increase their academic burden in the future. Motivated students are generally more willing to allocate additional time to review concepts, practise analytical problem-solving, and complete assignments more accurately. Conversely, students with low

motivation tend to perceive economics assignments as monotonous and cognitively exhausting, reducing persistence and encouraging academic procrastination behaviour.

Moreover, high learning motivation also encourages stronger self-regulated learning. In economics learning, which often involves analytical exercises and case-based problem solving, students require consistent learning discipline and long-term study planning. Students with high motivation tend to be more capable of setting learning goals, monitoring their learning progress, and maintaining concentration when dealing with complex economics tasks. Through stronger self-regulated learning, students become more capable of controlling their learning behaviour and reducing tendencies to delay academic assignments. These findings suggest that learning motivation functions not only as an emotional drive but also as a psychological resource that helps students remain engaged in cognitively demanding learning situations. These findings are consistent with previous studies indicating that high learning motivation is associated with lower academic procrastination and stronger self-regulated learning behaviour (Niazov et al., 2022; Rahmawati et al., 2025).

The study also demonstrated that self-regulated learning negatively affected academic procrastination. In economics learning, students with strong self-regulated learning abilities tend to be more capable of managing time, prioritising tasks, and maintaining learning consistency when dealing with complex and analytical economics assignments. The ability to regulate learning behaviour enables students to reduce tendencies to delay academic tasks. These findings indicate that self-regulated learning serves as an important mechanism in helping students cope with economics learning demands that require discipline and independent learning management. These findings are consistent with previous studies showing that self-regulated learning helps reduce academic procrastination through better time management and behavioural control (Bakhtiar & Hadwin, 2022).

The findings showed that academic pressure negatively affected academic procrastination. In economics learning, academic pressure often arises from dense materials, analytical assignments, deadlines, and continuous evaluation systems. These conditions may encourage students to complete assignments more immediately because delaying tasks can increase learning difficulties, particularly in cumulative economics topics that require understanding of previous concepts before learning more advanced materials. As a result, students tend to become more disciplined and focused in managing their academic responsibilities. This finding indicates that structured academic demands can reduce procrastination behaviour by encouraging greater task engagement. These findings are consistent with previous studies showing that academic pressure and deadlines can minimise procrastination behaviour (Lan & Nie, 2026; Mejeh et al., 2024).

Regarding the moderating effect, academic pressure did not significantly moderate the relationship between academic self-efficacy and academic procrastination, but significantly strengthened the relationship between learning motivation and academic procrastination. In economics learning, academic pressure often emerges from dense learning materials, assignment deadlines, analytical exercises, and evaluation systems that continuously demand academic performance. However, academic self-efficacy tends to function as a relatively stable internal belief, meaning its influence on procrastination behaviour does not substantially change under different levels of academic pressure. Students with high self-efficacy generally maintain confidence in their academic competence regardless of whether academic pressure is high or low. These findings suggest that self-efficacy is influenced more by personal beliefs than by external situational factors (Daud et al., 2024; Poluektova et al., 2023).

In contrast, academic pressure significantly strengthened the influence of learning motivation on academic procrastination. This condition indicates that highly motivated students tend to respond more positively to academic demands such as deadlines, workload, and evaluation systems. In economics learning, which is characterised by analytical and complex tasks, academic pressure may function as a driving force that transforms motivation into direct academic action. The high cognitive demands in economics learning may explain why academic pressure becomes more effective in strengthening motivated behaviour rather than influencing students' self-beliefs. Under structured academic pressure, motivated students tend to become more focused and disciplined because they perceive deadlines and academic demands as challenges that must be completed immediately rather than avoided. These findings support previous studies indicating that academic pressure and deadlines can increase task engagement and reduce procrastination behaviour (Feraco et al., 2023; Kausar et al., 2025). Based on Social Cognitive Theory, these findings demonstrate that environmental factors such as academic pressure can strengthen academic behaviour when interacting with strong internal motivation (Bandura & Cervone, 1986).

Conclusion

This study shows that academic self-efficacy and learning motivation have a negative, significant effect on academic procrastination, as well as a positive effect on self-regulated learning, which further contributes to reducing academic procrastination. Academic pressure has also been shown to have a negative effect on procrastination, but does not moderate the relationship between academic self-efficacy and procrastination, and only acts as a moderator with a relatively weak influence on the relationship between learning motivation and academic procrastination. These findings confirm the importance of personal, behavioral, and environmental factors in explaining academic procrastination.

Recommendation

Based on the findings, teachers are encouraged to improve students' academic self-efficacy, learning motivation, and self-regulated learning through contextual and analytical economics learning activities, such as project-based learning, market simulations, and reflective learning exercises, to reduce academic procrastination. In addition, academic pressure should be managed adaptively through proportional workloads and clear deadlines. Future research is recommended to examine other relevant variables, such as academic resilience and critical thinking skills, using longitudinal approaches.

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